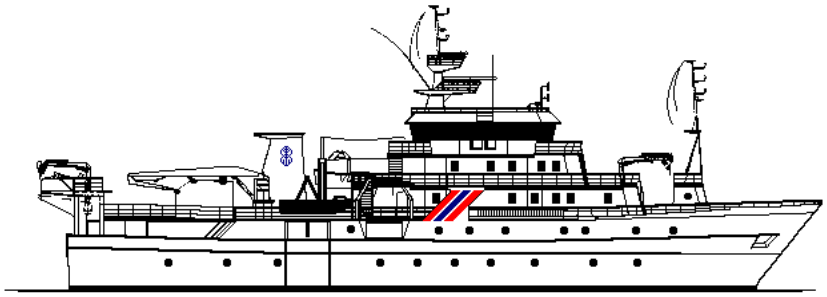

BCLME SURVEY NO. 1 2004

A TRANSBOUNDARY STUDY WITH EMPHASIS ON DEEP WATER HAKE IN THE LÜDERITZ - ORANGE RIVER CONE AREA

Cruise report No 5/2004

19 April - 2 May 2004

by

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1 Introduction

The first transboundary study in the region, focused on the life history of *Merluccius Paradoxus* in the area, was carried out on Dr. Fridtjof Nansen in February - March 2004. Research was conducted using transect (systematic) method of sampling over the shelf from Hondeklip Bay to Lüderitz (Figure 1). This provides better understanding of spatial and biological patterns, as compared to stratified random sampling methods. Unbiased estimate of abundance was not the target of this study. In order to study the life history of demersal species it is important to explore the main bathymetric and environmental features of the local shelf and slope system. Systematic survey design, combined with additional detailed sampling in areas of assumed key importance, seems to be more successful in discovering these features.

The February - March study resulted in better bathymetric maps with especially detailed features in a key area on the slope (Figure 2 and Figure 3). Several CTD transects were made and a current meter rig with two current meters were deployed on the slope of Child's Bank (Figure 4) to improve our understanding of environmental processes in the area.

Preliminary analysis of the data resulted in two, not mutually exclusive, hypotheses concerning distribution, migration and abundance of *M. Paradoxus* in Namibian waters.

First hypothesis underlines the apparent lack of juvenile and young *M. Paradoxus* north of Lüderitz, a big adult population along the slope, and sexual immaturity of this adult population in Namibian waters. It is argued, that *M. Paradoxus* breeds almost exclusively in South African waters and juvenile fish are later following prevailing currents and/or density structures of available prey. This leads them to the slope area of South African waters south of the Orange River (around 30°S) where they migrate north as adult fish, following the slope along the 300 - 500 m depth range. As the slope narrows and become steeper around the plateau of the Child's Bank this has a form of a "caravan of fish" moving northwards. High catches in the hake fishery in this area supports the assumption that there is a concentration effect present in the area. Further northwards the channel opens to a wide area, the habitat of sub-adult and adult stock of *M. Paradoxus* in Namibia. If this stock does not return to South Africa to spawn it can be subject to a stronger fishing pressure as it does not contribute to recruitment.

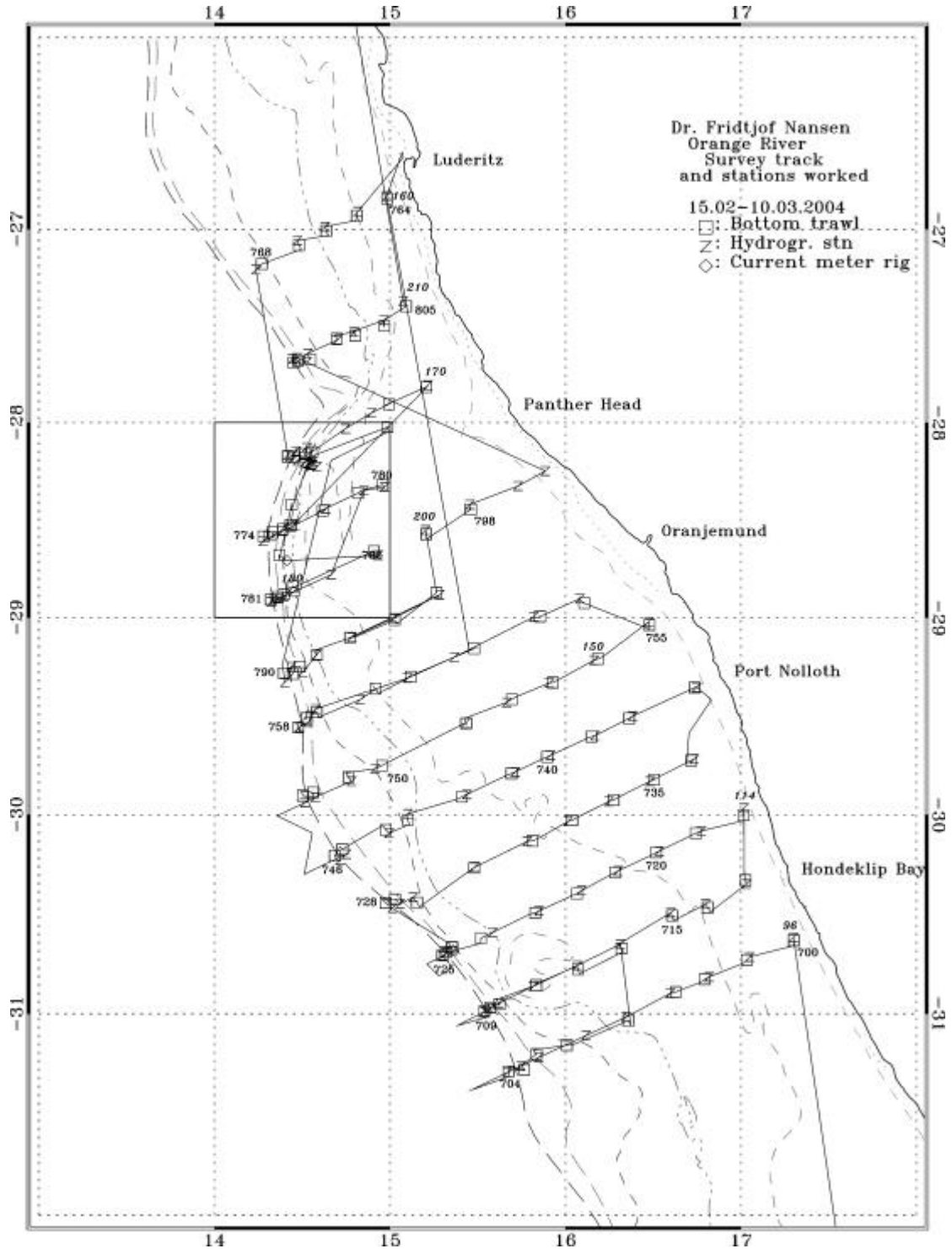

Figure 1 Course track and fishing and hydrographic stations 15.02 - 10.03.2004.

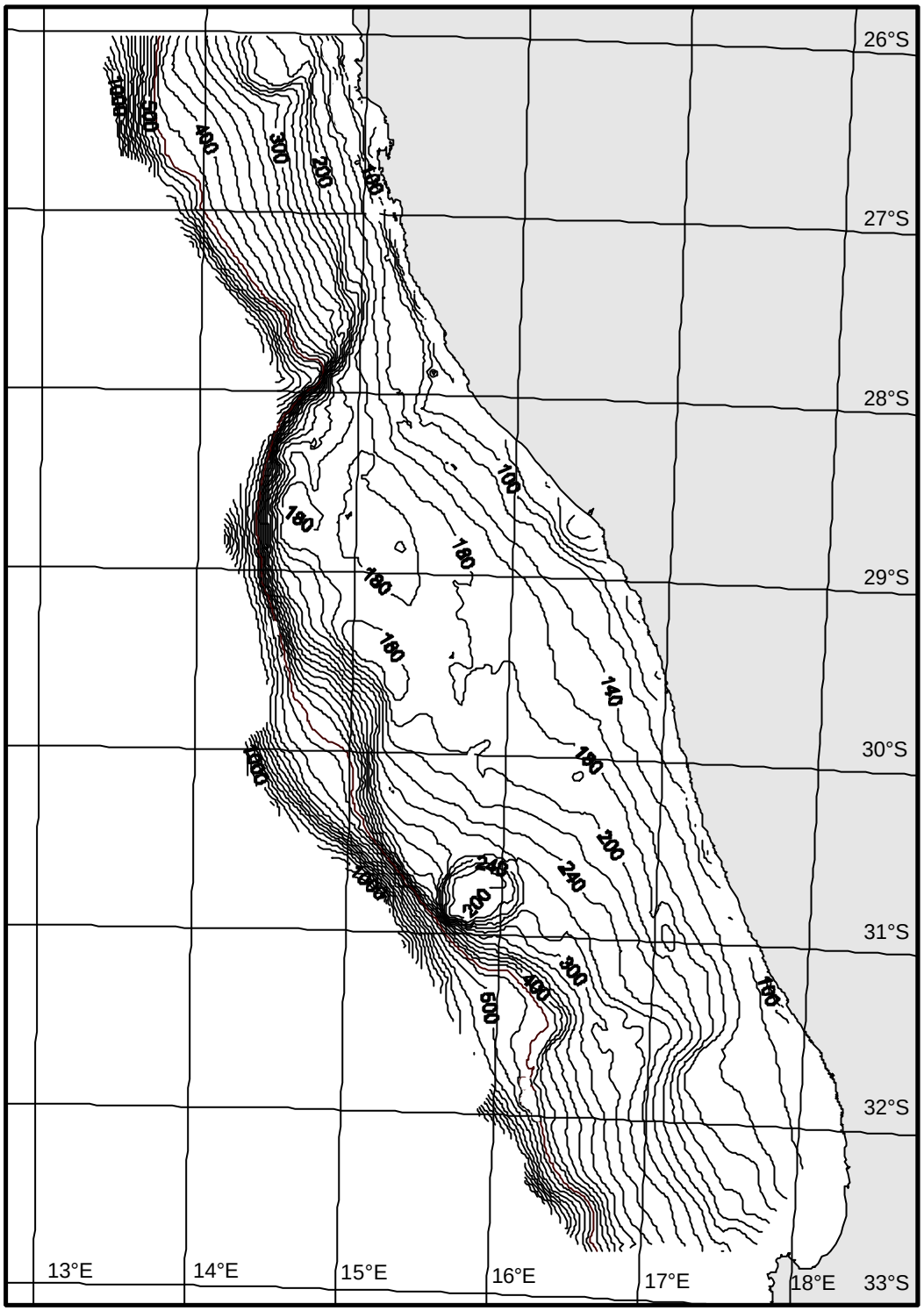

Figure 2 Bathymetric map based on soundings from Dr. Fridtjof Nansen surveys between 1996 and 2004.

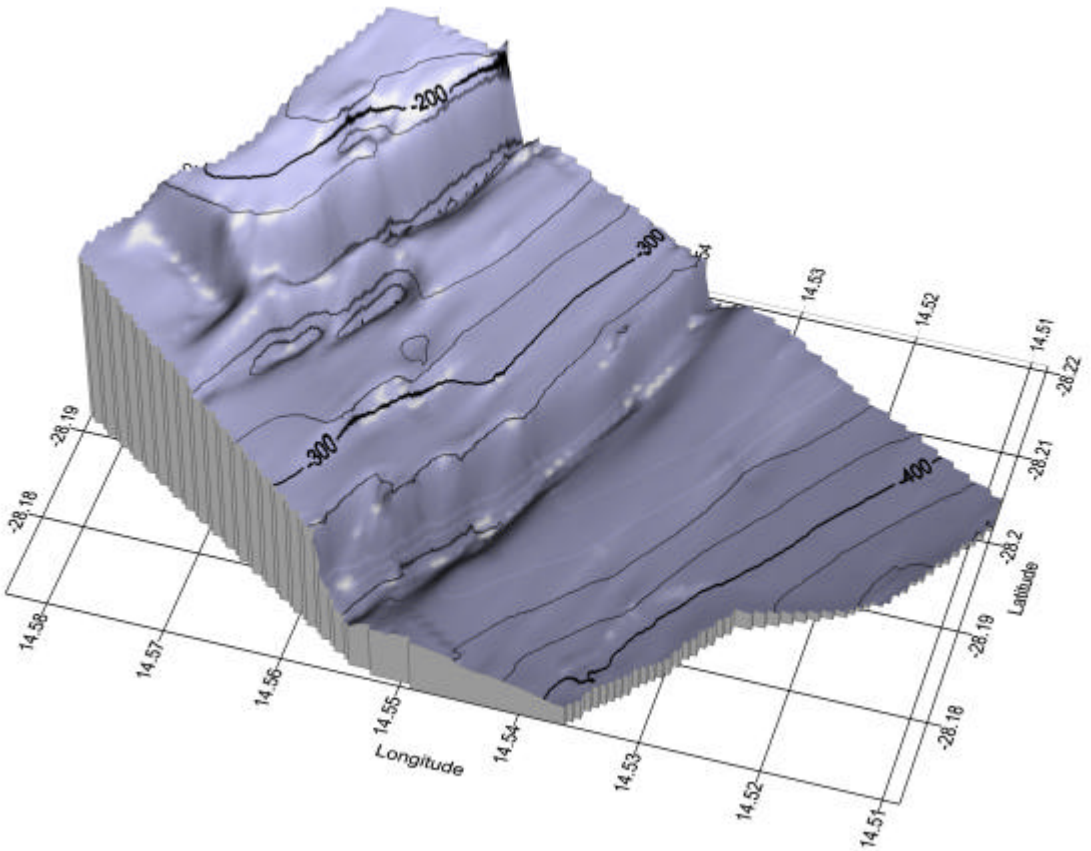

Figure 3 Three-dimensional bathymetric map based on echo soundings from the survey in February-March 2004.

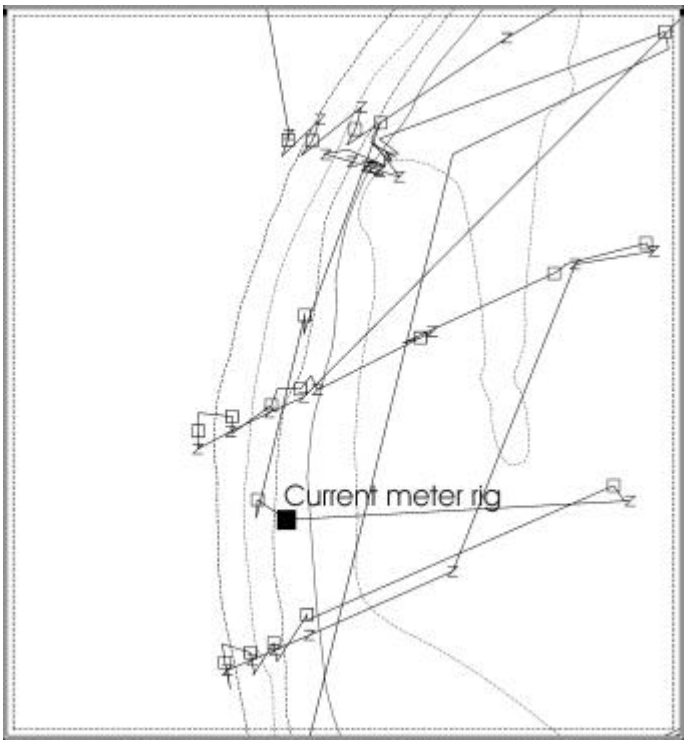

Figure 4 Location of the current meter rig deployed on 3 March 2004.

Second hypothesis postulates that *M. Paradoxus* may spawn as far north as Panther Head (around 28°S) but the main source of the juveniles are still south of the Orange River. However at certain times of the year or at certain environmental conditions the shelf between Orange River and Lüderitz opens as a channel for juvenile fish to migrate northwards. This explains that juveniles and young fish were observed on Child's Bank and over the slope in the previous survey. The deepwater hake then enters Namibia in a young stage and most of its growth to adulthood takes part in Namibia.

The solving of these questions would have importance on how the deepwater hake is managed as a shared stock between Namibia and South Africa.

The objective of the present cruise was to collect more data of relevance for resolving which hypothesis on *M. Paradoxus* is the most plausible.

2 Materials and Methods

2.1 Registration of weather conditions

The underway weather data aboard R/V Dr. Fridtjof Nansen are logged with the Aanderaa Weather Station unit fitted with the following sensors:

Sensor type	Measurement units
Air temperature	Degrees °C
Wind speed	m/s
Solar radiation	W/m^2
Wind direction	Degrees re. the magnetic N. Pole
Sea surface temperature	Degrees °C

All sensors but Sea surface temperature (SST) are mounted on a mast positioned midships, at about 20 meters above the sea level. The SST sensor is located at the intake of the water for cooling the engine and it readings are representative to a water layer at about 5 meters below the sea level.

The weather station data were logged continuously throughout the survey. The results presented in this report are based on a standard output from the logging system comprising one nautical mile averages along the ship's track.

2.2 Hydrography

The data on temperature salinity and oxygen were collected with a CTD *Seabird 9* plus probe between the surface and 10 meters off the bottom. CTDs were made at each trawl station and, additionally, in the course of the special study conducted in the shelf break area off Panther Head on 03 March. The CTD probe was fitted with a set of newly factory-calibrated sensors, installed on 17 December 2003. In addition, water bottle samples for oxygen and salinity calibrations were taken at almost all CTD stations.

The salinity samples were analysed with the Guildline Portasal salinometer unit. The laboratory conditions onboard are suitable to detect deviations between the CTD and *in situ* samples at a level of 0.005 of salinity units. Since no deviations reaching or exceeding this range were detected, the salinity values based on the factory calibration of the conductivity sensor are used throughout this report.

The samples for dissolved oxygen were titrated within 12 hours of sample collection, using the standard Winkler method.

2.3 Acoustic measurements

2.3.1 Acoustic equipment

The acoustic recordings were conducted using Simrad EK 500 echosounder coupled to a keel-mounted transducer of 38 kHz. Acoustic raw-data was logged on the Sun-Unix based Bergen Echo Integrator (BEI) version 2000. The technical specifications and operational settings of the echosounders used during the survey are given in Annex III together with the results from the last calibration of the system. The acoustic data were scrutinized using the post-processing module of the BEI software.

2.3.2 Classification

Scatterers were displayed at 38 kHz, standardized to 5 NM echograms with 1,000 pings (horizontal) by 500 bins (vertical). The mean 5 NM area backscattering coefficients s_A (m^2/NM^2) was allocated to a predefined set of species or species groups on the basis established echogram features. When concentrations of juvenile pelagic hake were encountered the s_A-values were stored with a 1 nm resolution.

Acoustic groups used were: a) Juvenile pelagic hake < 17 cm, b) older hake, usually demersal, c) horse mackerel, d) Pelagic group1 (pilchard, anchovies, red eye), e) Pelagic group 2 (pelagic fish not of Pelagic 1), f) demersal fish, not hake, g) mesopelagic fish, h) plankton. The classification was based on the characteristics of the echo traces, experience accumulated from previous similar surveys in Namibia since 1990 and in South Africa since 2000, supported when possible with results from nearby bottom trawl stations. Time constraints did not permit pelagic trawling on targets.

The results from the acoustic system are considered as a pilot study with the main aim of delineating the limits of distribution of juvenile pelagic hake and some information on relative densities. The figures will not be converted to biomass, as the target strength is uncertain and as the classification scheme and methods are too course for such a purpose. Adult hake were very rarely observed in the acoustic channel during daytime, while it showed up frequently above bottom at nighttime.

2.4 Trawl sampling procedures

The standard bottom trawl of Dr. Fridtjof Nansen, a Gisund Super shrimp cum fish trawl, was used in the survey and for the intercalibration. A description of the trawl and gear is given in Annex III. Dr. Fridtjof Nansen use a 20 m strap on the warps 105 m in front of the doors to keep the door and wingspread constant at 50 m and 21 m respective, independent of trawl depth.

A standard haul was 30 minutes at 3 knots, sometimes reduced to 20 minutes in areas of expected high densities. The exact time for start and stop of the trawl operation was determined by SCANMAR sensors. The output from the SCANMAR system was also recorded on files to facilitate later analysis of bottom contact and door-spread if necessary.

For conversion of catch rates (kg/hour) to fish densities (t/nm^2), the effective fishing area was considered as the product of the wing spread and the haul length, or distance over the

bottom, based on GPS readings. In the survey a nominal distance of 18.5 m was applied to facilitate analysis with previous surveys. The area swept for each haul was thus 18.5 m times the distance trawled, converted to nm^2. The catchability coefficient (q), i.e. the fraction of the fish encountered by the trawl that was actually caught, was conservatively assumed equal to 1, to allow comparison with previous results.

2.4.1 Handling the catch

In most cases, the whole trawl catch was sorted and all species were recorded with their weight and numbers. For especially big catches the abundant species were sub-sampled while the other fish were sorted out. Length measurements (total length) were taken for target species. The length of each fish was recorded to the nearest 1 cm below. The mantle length of squid was measured to the nearest 1 cm below. All samples of small hake was checked for the species identity by vertebrae count (usually 3 - 5 fish were examined).

An electronic measuring board was used for length measurement, main sample weights were recorded by Scanvaegt electronic balances and a Marel weight was used for single fish and small species measurements.

2.4.2 Biological samples

Biological samples were collected for the two hake species in special areas. The following information were collected: Sex, maturity stage, gonad weight and stomach content. The maturity scale used was the one adopted at Marine and Coastal Management, Cape Town:

3 Narrative

The scientific staff consisted of:

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NatMIRC, Namibia:

Paul KAINGE and Toini MWEENDA

IMR, Norway:

Tore Strømme, Oddgeir ALVHEIM, Tore MØRK and Terje HOVLAND

The cruise tracks with fishing and hydrographical stations are shown in Figure 5

The vessel departed Walvis Bay in the afternoon on 19 April. The vessel steamed southwards and started working the northernmost transect (between Panther Head and Lüderitz). During the next three days the inner part of the Panther Head transect and the whole Orange River transect were worked. Additional CTD stations were done near Tripp's Sea Mount. On 25 April morning stations were worked along the shelf on depths between 330 and 490 m and the afternoon was allocated to pick up the current meter rig deployed in March. The acoustic release was detected by acoustic communication, but the floats of the rig could not be detected on the echosounder. The release unit confirmed the acceptance of a release command, but the rig did not ascend. Most probably the current meter with floats are lost, perhaps due to trawling activities in the area. The next day trawl sampling was resumed at the outer part of the Panther Head, but rough weather stopped the trawling midday. The following days stations along the slope (420-490 m) and on the outer shelf (170-190 m), and the Panther Head transect were completed. The last two transects were executed at the end of the survey finishing the work in the afternoon of 30 April. Walvis Bay was called in the evening on 1 May.

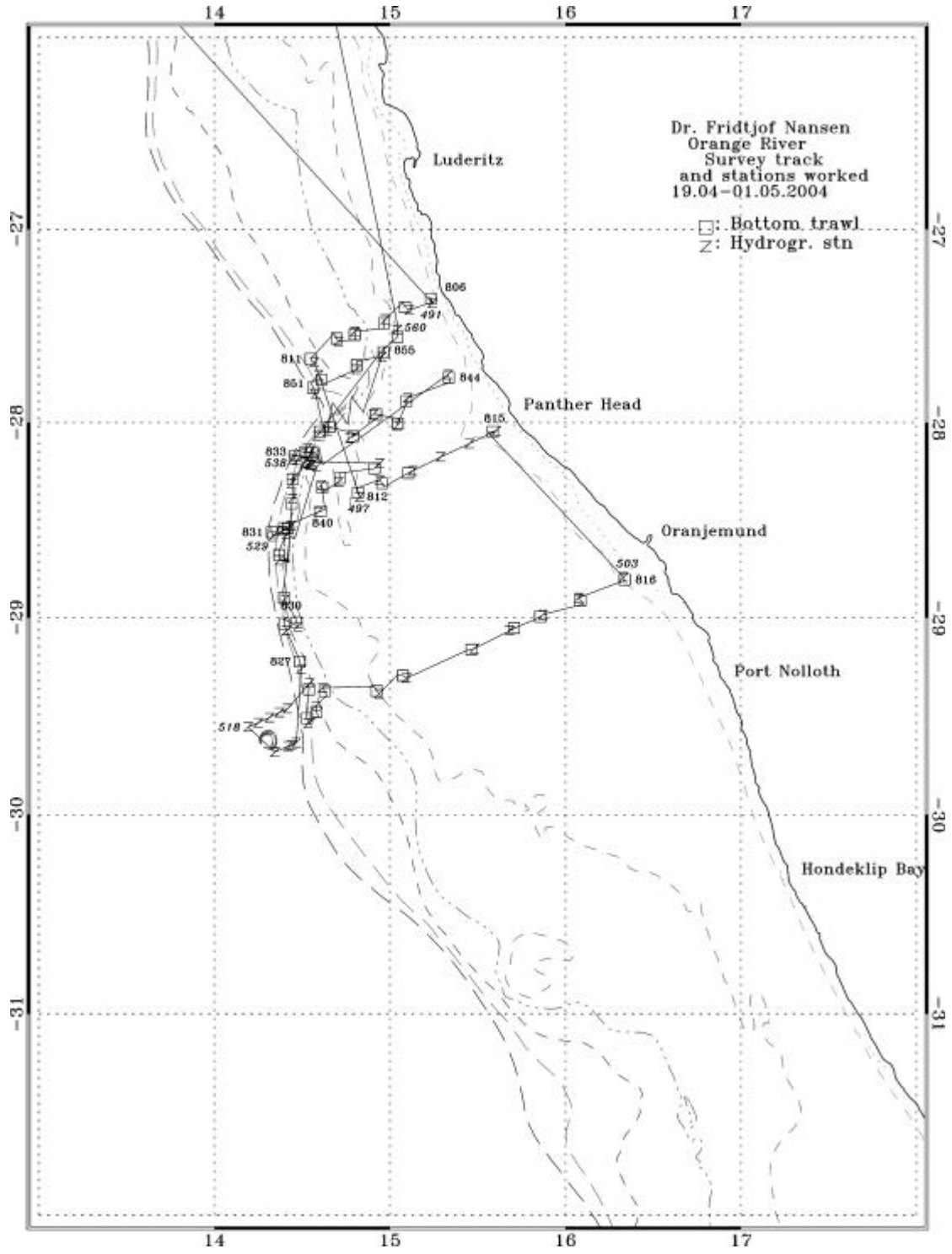

Figure 5 Course track and fishing and hydrographic stations.

4 Results

4.1 Bathymetry

During the previous BCLME survey, we have developed a digital terrain model (DTM) for the Child's Bank based on the acoustic soundings from the past surveys with R/V Dr. F. Nansen. Due to the insufficient data coverage, however, our DTM inaccurately resembled the bathymetry of the northern section of the bank. During this survey, this shortcoming was greatly eliminated due to an addition of new survey tracks collected during the two last BCLME surveys. Table 1 provides a summary of the updated version of the Child's Bank DTM. A bathymetric chart based on the DTM is depicted in Figure 6. The new DTM has revealed new features of the bottom bathymetry, which have helped us understand features of hydrography and fish distribution in the northern Child's Bank. One of these was the bottom configuration encountered along the narrowing portion of the continental shelf between 28°10' and 29°40' S, in the depth range preferred by the adult hake. The westward end of the relatively flat bottom of the basin above 200 m depth is in this area terminated with a steep underwater cliff. From the base of the cliff at about 260 - 280 m the bottom exhibits two flat ledges separated by a 50 m fault, the lower one extending to the upper continental slope area at a depth of 450 - 500 m. Another feature was a shallow (20 - 40 m deep) depression running in the center of the Child's Bank, north of 30°S. Despite of a small sill depth, this depression appears to promote a northward spread of the dense bottom water uplifted at Hondeklip Bay upwelling center along the bank.

The current status of the DTM could be further improved by adding more sounding data from new surveys with R/V Dr. F. Nansen or data from other vessels equipped with high-quality research echosounders. For instance, there is a need to improve the coverage along the bank's western edge south of 29°40' and to include the area around the Trip Seamount (29°37 S, 14°15 S).

Table 1 Summary of the DTM for the Child's Bank derived from the R/V Dr. Nansen acoustic soundings.

Latitudinal extent:	25°42' - 32°47' S
Longitudinal extent:	13°21' - 18°12' S
Cartographic projection:	Transverse Mercator, $?_0$=14° S
Number of source data used in interpolation:	25348
Interpolation method:	Kriging with the variogram model:
	?(x) = 0.0115 Lin(x) + 0.0115 Nugget(x)
Output format:	Raster map
Raster (node) size:	1 x 1 nautical mile
Number of pixels:	260 x 440
Applicable depth range:	100-700 m
File format:	Flat binary stream or Surfer grid (.GRD)

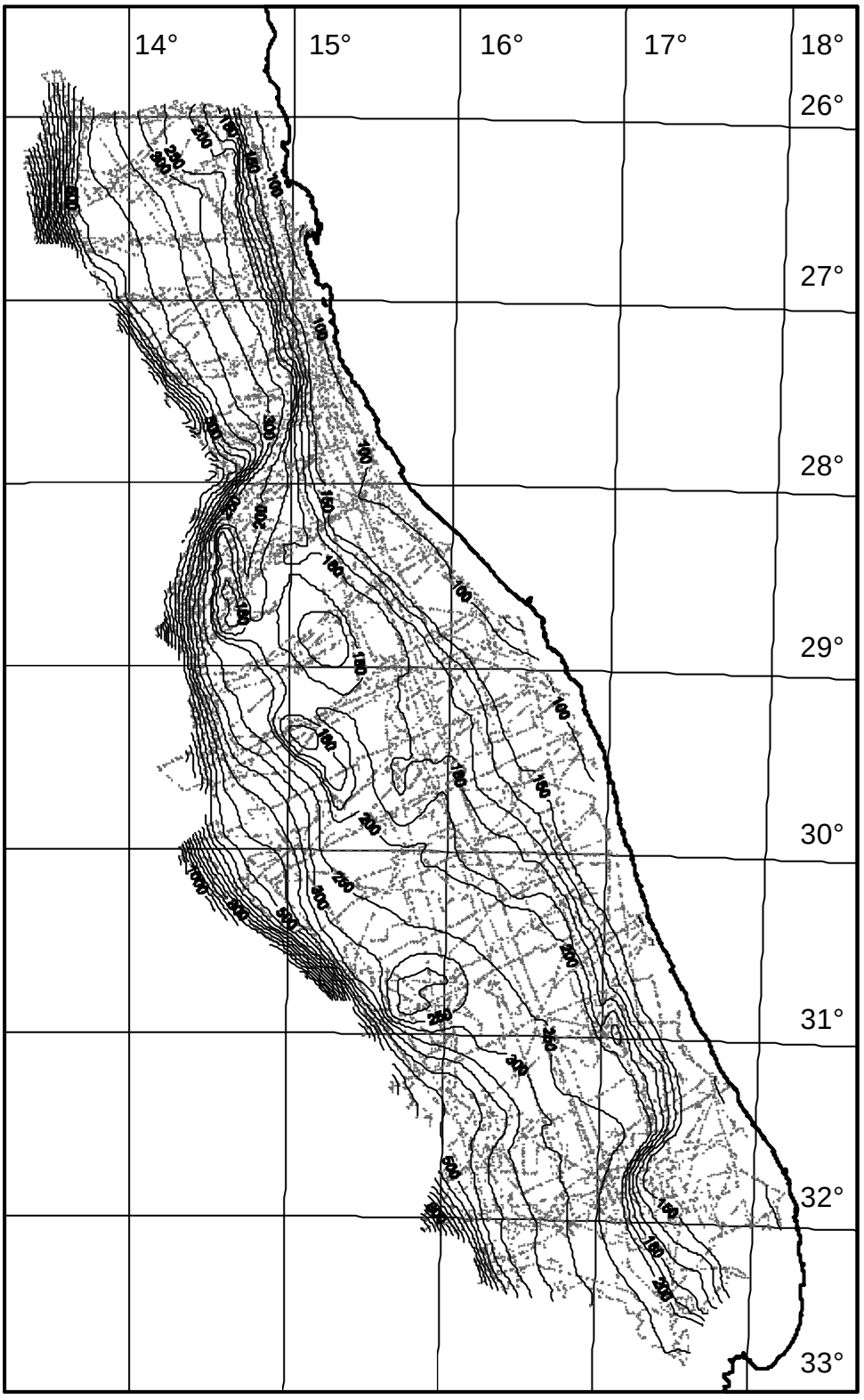

Figure 6 A bathymetric map of the Child's Bank and adjacent areas obtained from the digital terrain model (DTM) described in this section. The survey tracks applied to generate the DTM are shown in the background.

4.2 Hydrography

In this report, we focus on changes in the distribution of seawater properties in the survey region that occurred between the summer and autumn. We compare the results from the first survey in February - March with these collected during the current survey in April - May 2004. The area covered in this survey was smaller than in the previous one, limited to the Namibian section of the Child's Bank located to the north of the Orange River mouth. The total number of the occupied CTD stations was 70. Most of these stations accompanied the trawling operations and served other purposes than to resolve spatial scales of oceanographic processes. Nevertheless, three systematic CTD lines with a station spacing that followed the topographic gradient were also occupied and these will be used for the purpose of this report. To describe changes that took place between February and April, we include the CTD stations occupied at the same or proximate locations during the first survey.

4.2.1 Station distribution

Distribution of the three principal CTD lines is depicted in Figure 7. The nine densely spaced stations (sta. 530 - 538) in the northwest corner of the survey area occupied a line running off the western edge of the Child's Bank basin towards the edge of the continental slope. Its purpose was to map the vertical water mass structure across the deep region of the shelf, representative to a habitat of an adult hake. The station spacing was exceptionally small, ranging from 0.3 to 2 nautical miles, in order to match the strong gradient of the local bathymetry. The same line, although short of the outermost station was occupied during the February - March survey. The comparison between these two lines is depicted in Figure 9.

The water mass structure across the shallow portion of the survey region between 100 and 200 m depth was during April investigated by means of a CTD line running offshore off the Panther Head Cape (27°56' S, 15°40'E, Stations 502 - 545 in Figure 7). Since only the three stations from this line, namely 497, 497 and 545, had been occupied during the summer survey, we have selected an another line from the February survey, which had run about 15 nautical miles to the south of the Panther Head line, (Stations 179 - 203 in Figure 7).

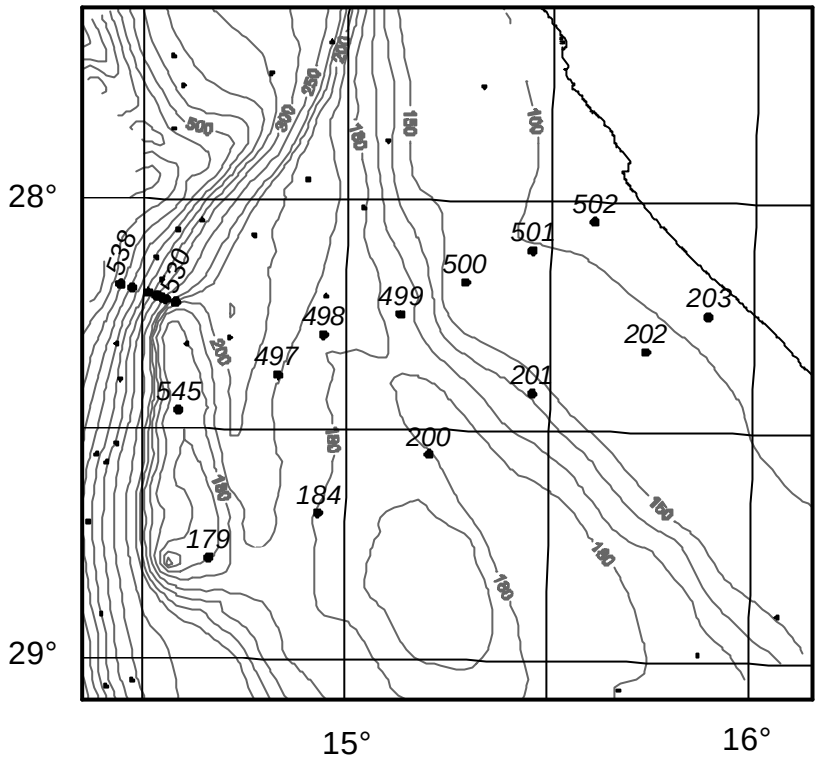

Figure 7 Distribution of CTD stations along the three principal lines referred to in Section 3. These are overlaid on the digital terrain model of the Child's Bank (Section 4.1). The small, unlabeled circles represent locations of the remaining CTD stations occupied in this region during April - May 2004.

4.2.2 Variability on the outer shelf.

The longshore wind stress over the survey area is directed equatorward all the year round. This favours a perennial upwelling along the coast, which drives the surface waters offshore and brings nutrient-rich near-bottom water masses from the shelf-break and slope area to the vicinity of the coast. The absence of major wind reversals notwithstanding, the hydrography in the region exhibits a distinct seasonal cycle. The SST gradient is strongest and closest to the coast in summer, expanding offshore in autumn and winter. In the survey region, around 27 - 28°S where the shelf narrows, an anticyclonic meander has been reported by numerous observations (Strub et al. 1998). Its strongest signature appears to occur in summer. Associated to the SST field is a northward spread of warm and saline water at a depth 50 - 100 m, originated from the Agulhas Retroflection (Lutjeharms and Van Ballegoyen, 1998). These facts in conjunction with the dominant equatorward wind forcing appear to indicate that the coastal ocean in the survey region is isolated from the tropical Atlantic influences such as the poleward spread of the low-oxygen tropical water, which dominates the shelf hydrography off the northern and central Namibia (Duncombe Rae, in prep.).

The T-S diagram depicted in Figure 8 clearly demonstrates the change in the water masses composition that took place offshore of the Child's Bank between February and April. The subsurface water masses observed during summer have a distinctly higher temperature and salinity than these observed in autumn (T=14.5°C, S=35.35 at the potential density 26.25 kg/m3 versus T=13.9°C, S=35.1 in April). This indicates a seasonal change in the source of the subsurface water masses off the Child's Bank: from High Salinity Central Water (HSCW) related to the Agulhas retroflection during summer to Low Salinity Central Water (LSCW) originated in the Cape Basin in April. Figure 9 depicts vertical distributions of temperature, salinity, oxygen and potential density along the section from which the T-S diagram has been derived. In February, the stratification was strong, extended down to a depth 200 m and did not exhibit a horizontal gradient. On the Child's bank, where the bottom depth is less then 200 m this warm and saline water dominated the entire water column. To bottom fish that normally live below the shelf-break in the colder and less saline water, such a drastic change in the sea water properties between the deep water and that on the bank may have posed an environmental barrier preventing them from spreading inshore into the bank. Also notice a downward tilt of isopycnals below the shelf-break depth, suggesting a poleward flow at the base of the Child's Bank cliff (Figure 9 f).

In April, the vertical water mass structure off the Child's Bank has changed dramatically. The vertical stratification was greatly reduced and all seawater properties exhibited a pronounced depression, located just offshore of the western edge of the Child's Bank (Figure 9). This depression suggested that there existed an anticyclonic eddy, steered by the local topography and causing a mid-shelf upwelling of the cold and relatively low salinity deep waters into the Child's Bank. In addition, the upward tilt of isopycnals at all depths (Figure 9 g) suggests an equatorward current along the bank edge. Due to this upwelling, the hydrographic conditions near the bottom on the bank were not much different from these at the base of the clift. Hence, the bottom fish that normally prefers a deeper water may have been spread on the much shallower bank.

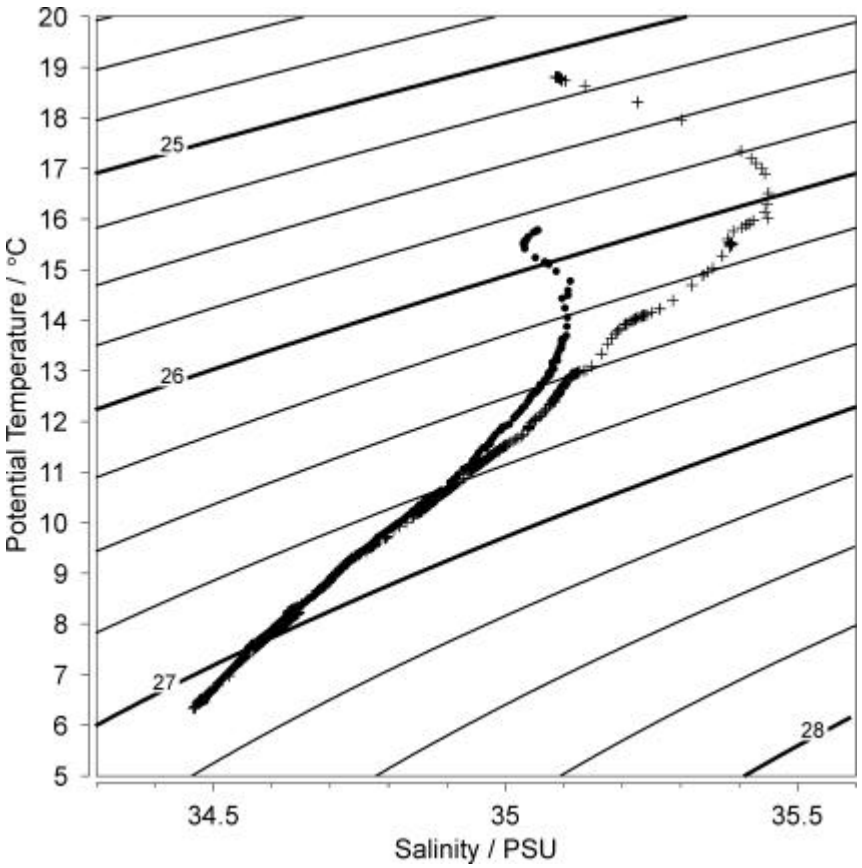

Figure 8 T-S diagram for stations 192 and 537 at a position 28°11.67'S, 14°28.35'E, occupied during February and April, respectively. The bottom depth was 537 m. The plus symbols describes the data from station 192 (February), while the closed circles pertain to sta. 537 (April).

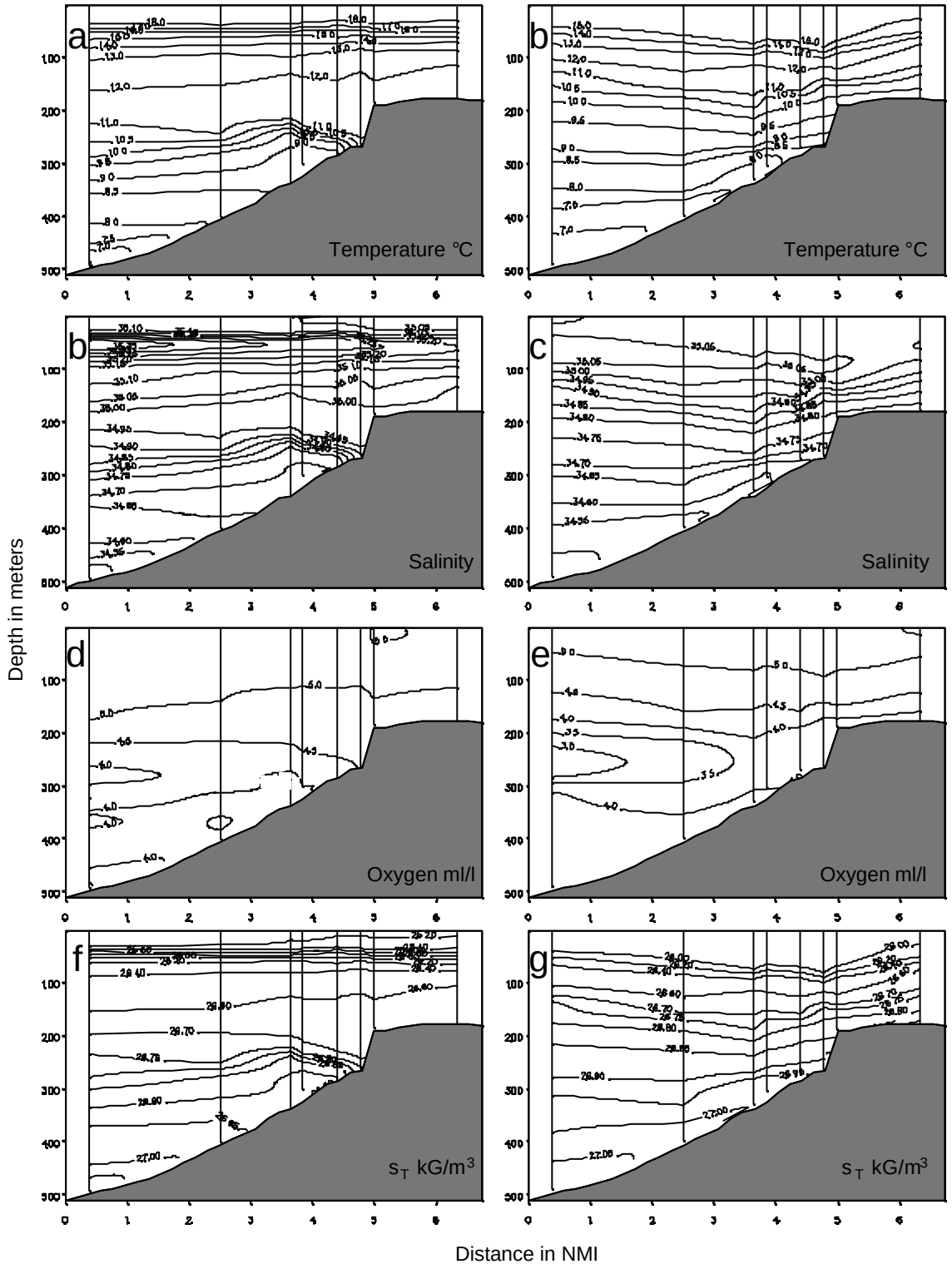

Figure 9 Distribution of seawater properties off the Child's Bank in February and April 2004. The panels to the left pertain to the February survey, these to the right depict the April result. Locations of stations correspond to Stations 530 - 537 in Figure 7

4.2.3 Variability on the Child's Bank

The variability in the distributions of the seawater properties in the interior of the Child's Bank (Figure 10) exhibits two distinct patterns. The outermost station follows the same pattern as that has been observed for the offshore section in Figure 9. In summer, warm and saline water masses advected along the Africa's coast from the Agulhas retroflection dominate the vertical water column of the outer bank, to be replaced in autumn by the colder and less saline water uplifted locally by the mid-shelf upwelling. The entirely different pattern occurs in the near the bottom over the central part of the bank. All seawater properties exhibit a presence of a cold and low salinity plume, with T-S characteristics matching the waters masses observed at depths 500-600 meters on the outer shelf. This plume does not appear to be sourced by a local upwelling. Rather, it is related to the deep water masses welled up off the Hondeklip Bay upwelling centre and advected to the north along the shallow depression, which carves the center of the Child's Bank. The bathymetry of the Child's Bank has been described in Section 4.1. In Figure 11 and Figure 12 we use the derived digital terrain model (DTM) and the data collected during the February survey to depict a possible pathway of this plume along the bank. Figure 11 depicts the alongtrack SST map overlaid on the DTM. It is obvious that the strongest upwelling takes place in an area where the shelf bottom descends gently and steady towards the continental slope, which happens to occur off the Hondeklip Bay. (Note also the fragment of the Lüderitz upwelling cell captured by the SST map in Figure 10) depicts distribution of density at 155 meters. From this distribution, it is obvious that the dense inshore waters are formed at the location of the Hondeklip Bay upwelling and are spread northwards along the depression in the centre of the Child's Bay.

The potential density of this Child's Bank bottom water exceeds 26.85 kg/m3, its salinity is less the 35.75 and temperature is below 9.5°C This places it in the lower range of Atlantic Central Water described by the T-S diagram in Figure 8. However, its oxygen concentration is distinctly lower from the oceanic water, apparently due to increased productivity and oxygen consumption on the shelf. The plume does not exhibit seasonal changes between February and April. The observed aggregations of the bottom fish that typically dwells in a depth range 300 - 400 meters in the centre of a much shallower Child's Bank may be related to the presence of this water.

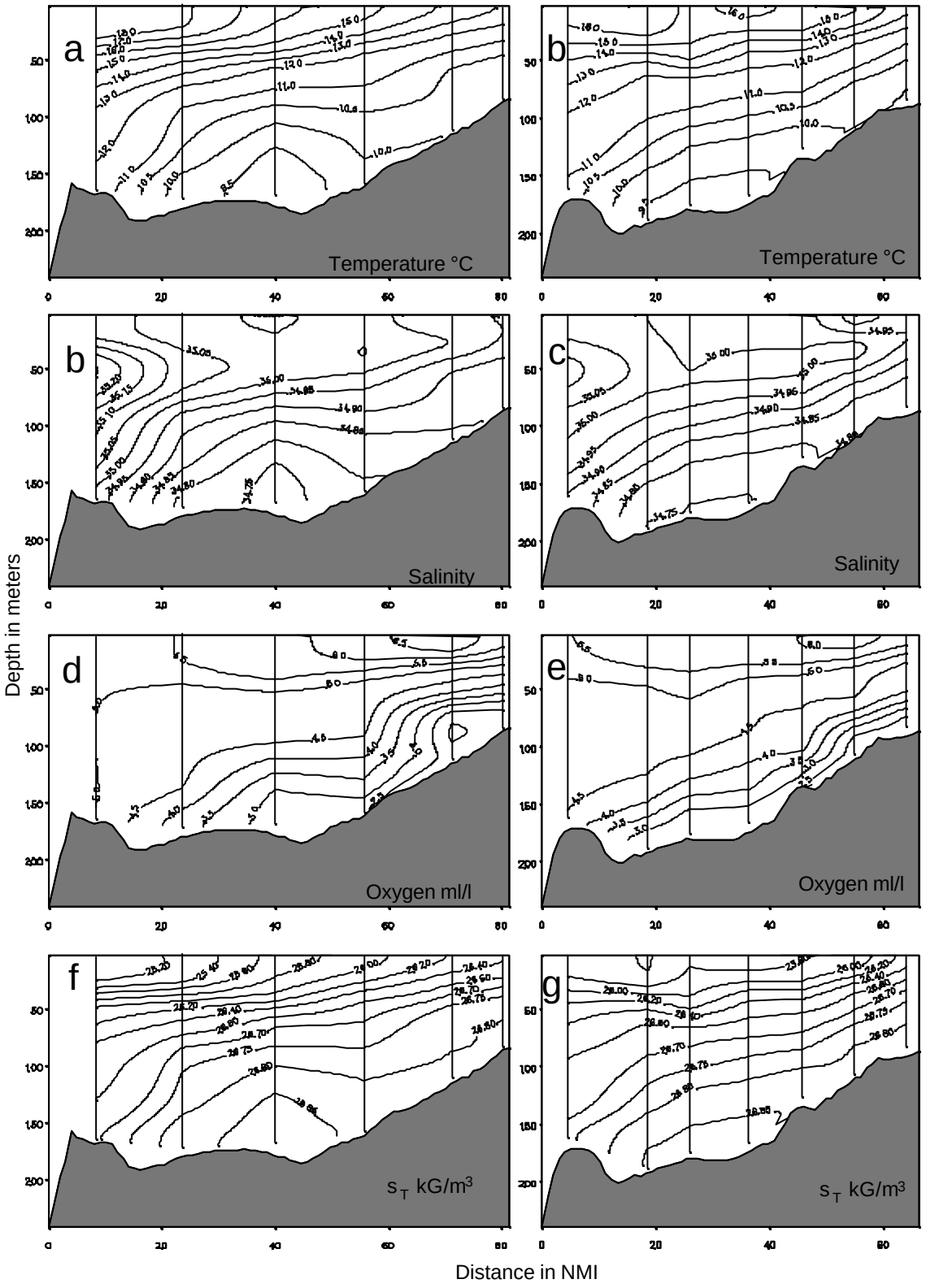

Figure 10 Distribution of seawater properties on the Child's Bank in February and April 2004. The panels to the left pertain to the February survey, these to the right depict the April result. The locations in the stations are depicted in Figure 7

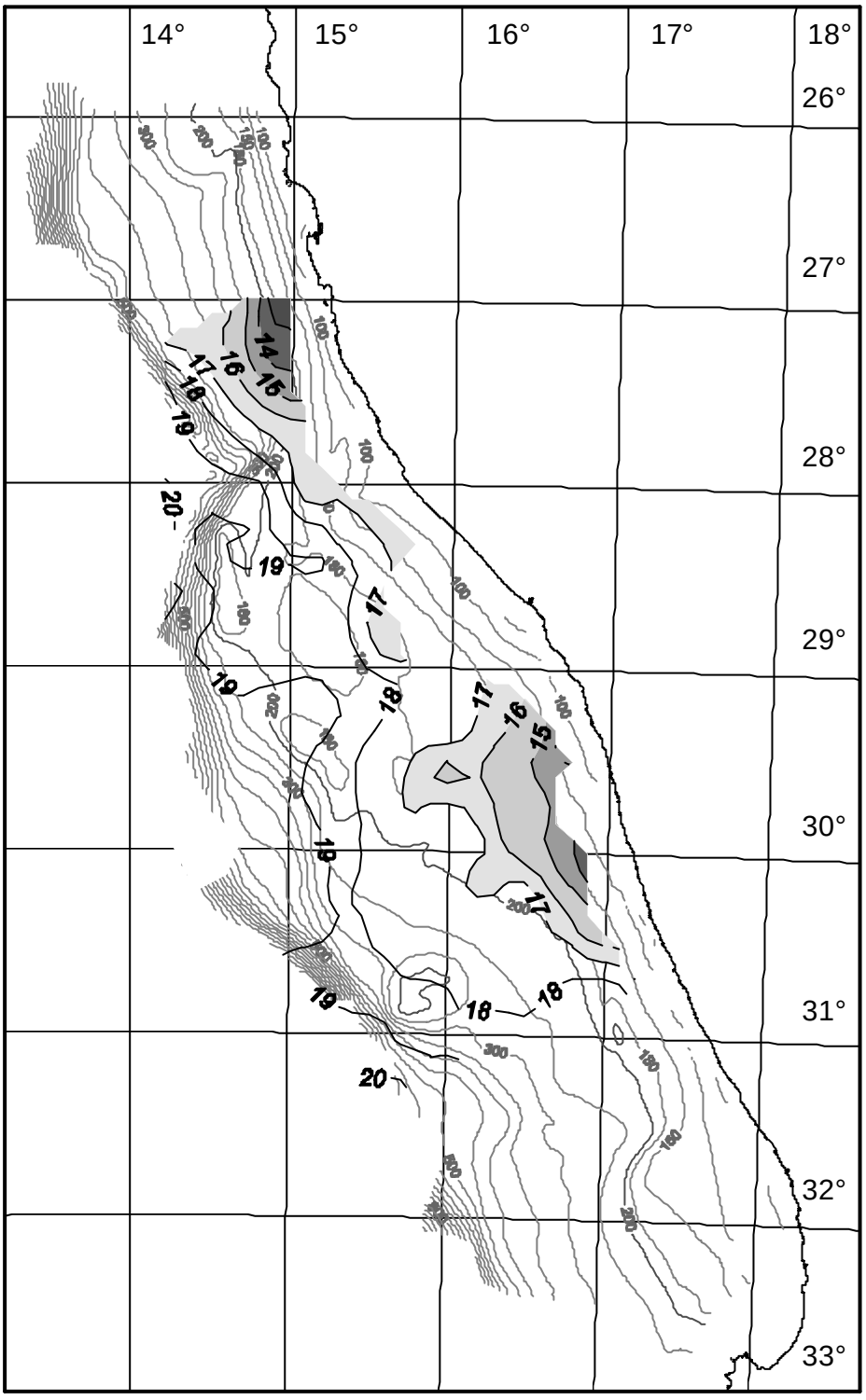

Figure 11 Distribution of sea surface temperature during February 2004 overlaid on top of the digital terrain model of the survey region.

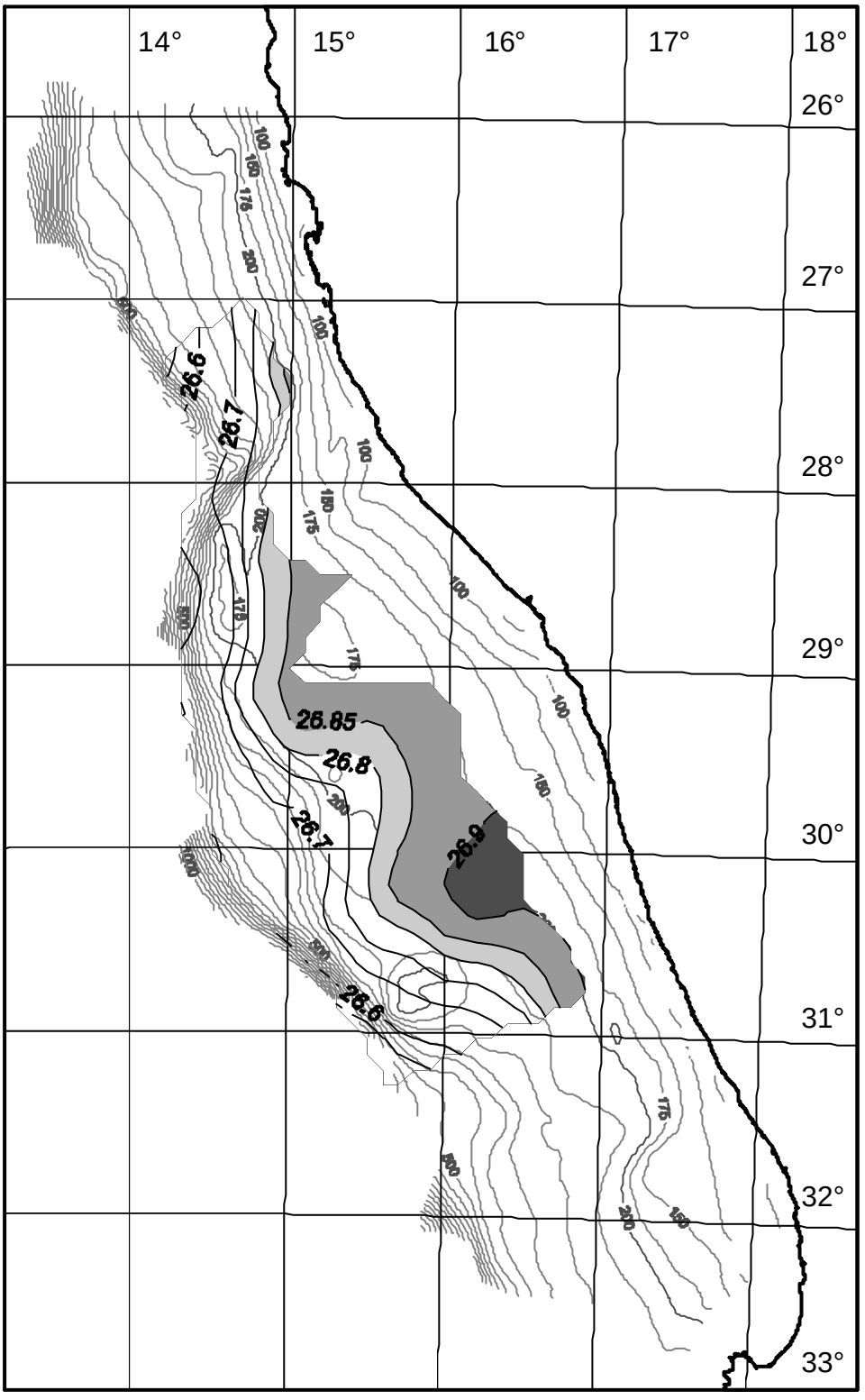

Figure 12 Distribution of potential density at 155 m depth during February 2004 overlaid on top of the digital terrain model of the survey region.

4.3 Biology

Annex I shows the complete record of the fishing stations and Annex II shows in table form the catch rates of the two hake species grouped by juveniles (<21 cm) and bigger fish.

Figure 13a - h shows the distribution of the *M. Paradoxus* within the study area, sorted by 5 cm classes until 35 cm and in one accumulated group beyond 35 cm. The small fish, less than 11 cm, Figure 13a, is still mostly in a pelagic state but occurs frequently in the trawl on the shelf indicating it main distribution area. The 11-15 cm group, Figure 13b, shows the highest densities on mid shelf and well spread from Orange River to 28°S. From the 16 - 20 cm to the 21 - 25 cm group is seen a gradual thinning of fish on mid shelf and concentrations in the Northeast, at Childs Bank, Figure 13c - d. These two groups also now start to show up at the upper part of the slope 200-300 m. The movement towards the slope is progressed in the following size classes, Figure 13e - f and from 36 cm, Figure 13g most of the fish is at the slope and deeper than 300 m. The older fish, larger than 35 cm, Figure 13h is concentrated around 400 m. The series also shows that Childs Bank is an area for small fish and does not hold fish larger than 35 cm.

A comparison with the survey in February March, extracting the stations that pertain to the same study area, shows similar patterns, Figure 14a - h. The very small fish, <10 cm, is located south of 28°30'S, and then a spreading northwards on the shelf follows in the 11-15 cm class, Figure 14b, followed by a movement towards mid shelf and partially the upper slope until 25 cm from when the movement towards the shelf takes momentum. As in the recent survey in April most of the fish is located on the slope when it is bigger than 35 cm. It is also clear that the Childs Bank area does not hold small or medium sized fish in February, in contrast to the picture from the recent survey.

Estimates of fish abundance has been calculated for the same length groups, based on the same contouring as in Figure 13and Figure 14. Table 2 shows the results from this.

Table 2 Estimates of abundance in study area by 5-cm classes in February and in April.

Length class (cm)	Numbers (millions) February	Numbers (millions) April	% difference
6-10	60	210	+250
11-15	180	553	+207
16-20	70	305	+336
21-25	95	72	-24
26-30	43	47	+9
31-35	27	14	-48
36+	9	13	+44
Total	483	1215	+152

The increase in the three smallest classes seems significant, but could be due to more immigration from south or from behaviour closer to the bottom in April. These classes are assumed to have its major components still in the pelagial. For the bigger classes we cannot yet conclude if this is a significant change or due to random error.

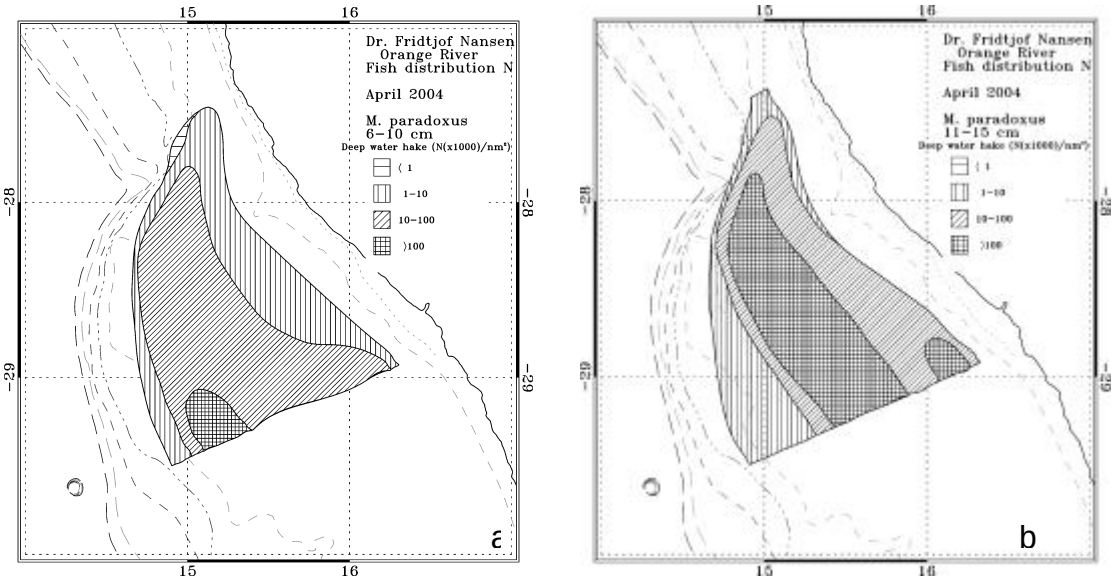

Figure 13a -h Distribution of M. Paradoxus in the study area in April 2004, grouped by 5-cm classes.

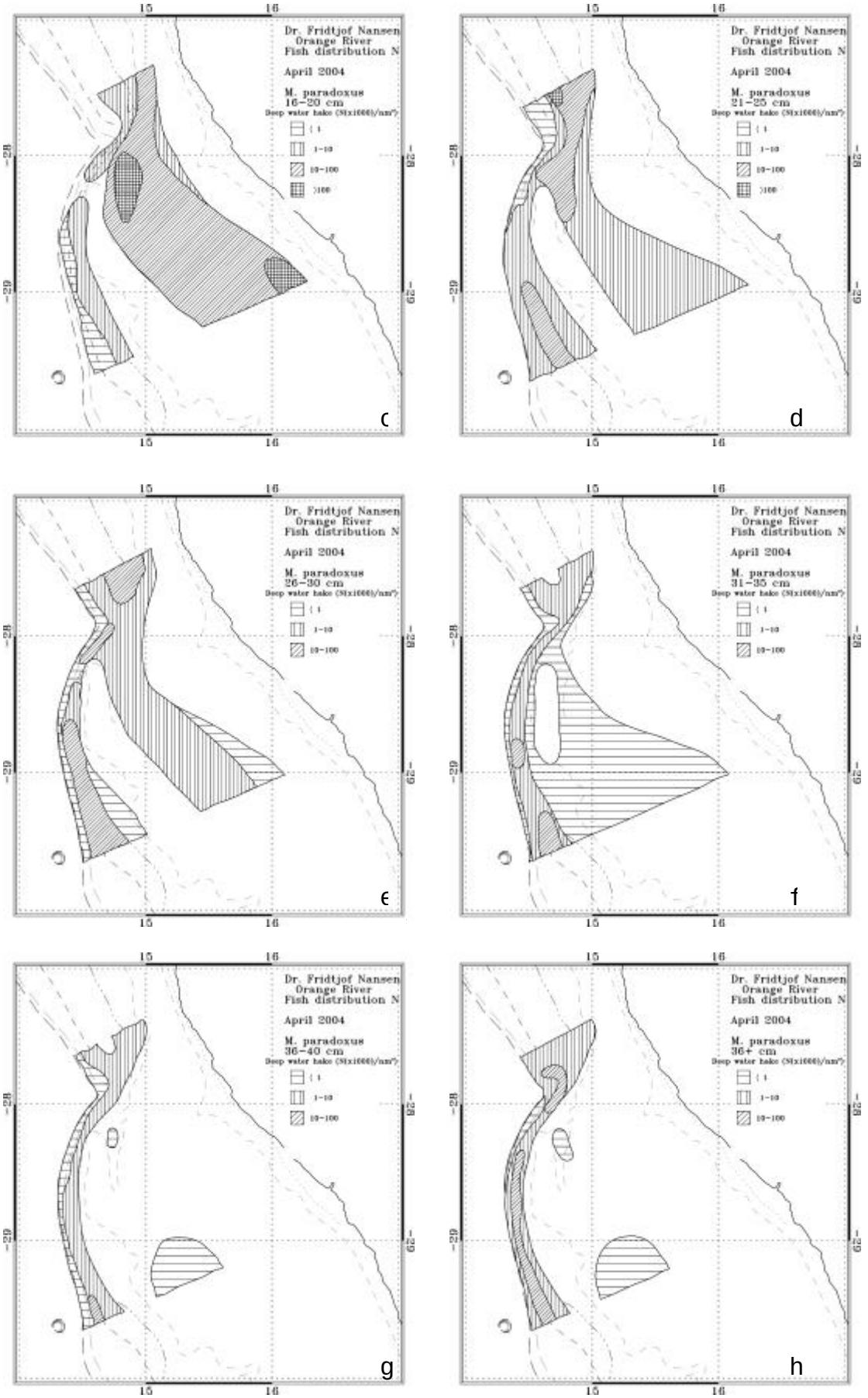

Figure 13a-h continued

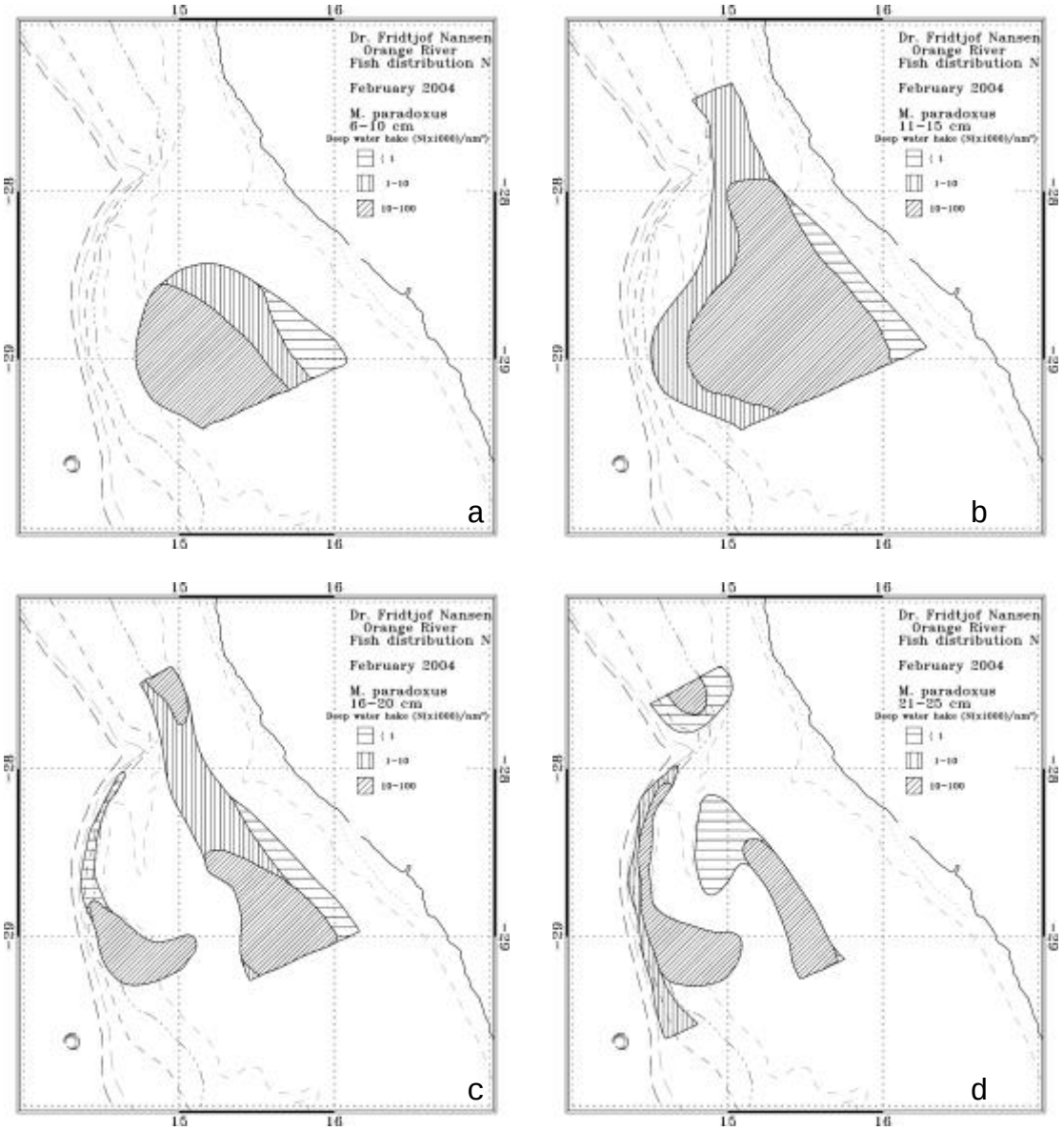

Figure 14 a-h Distribution of M. Paradoxus in the study area in February 2004, grouped by 5-cm classes.

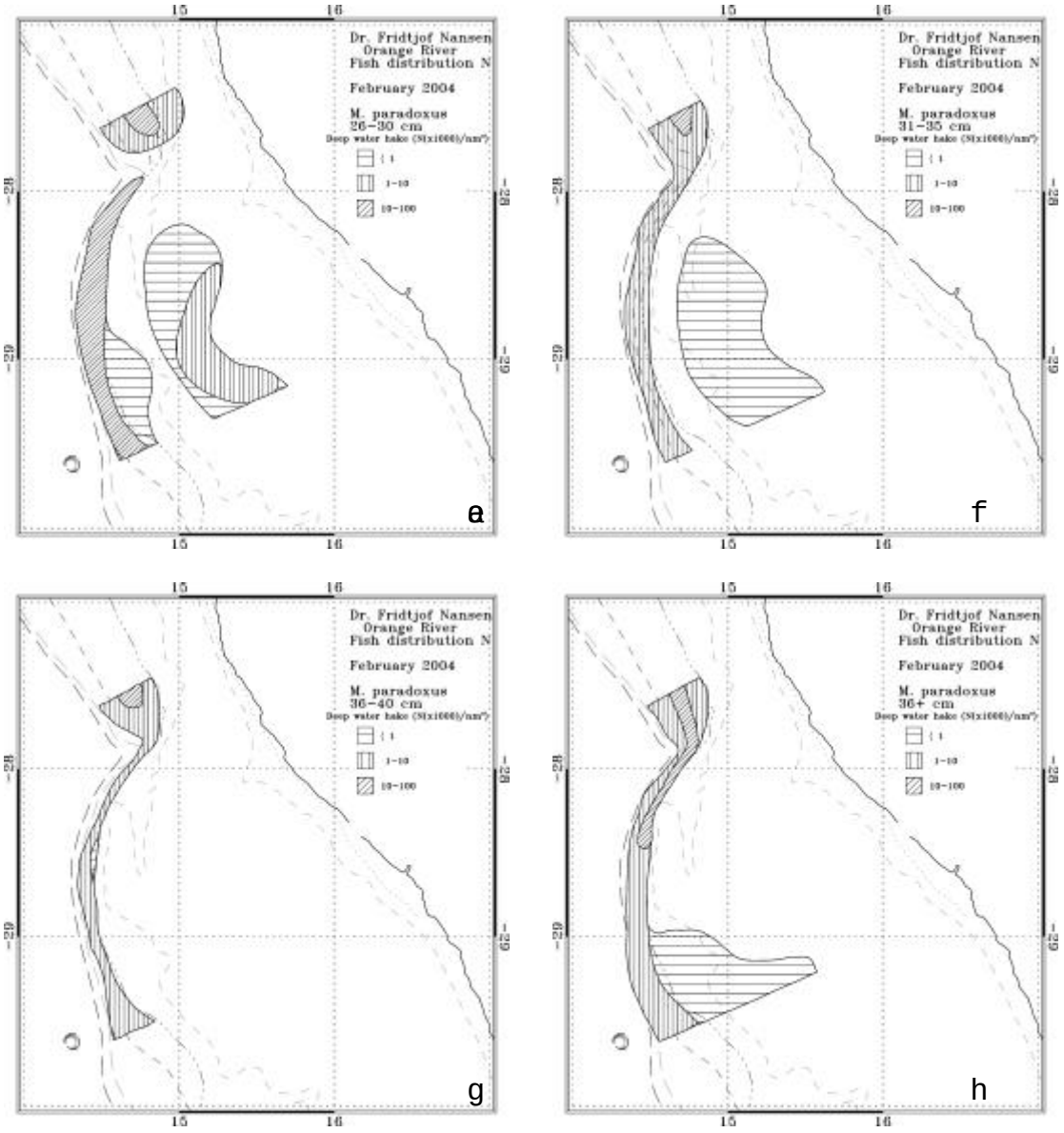

Figure 14a-h continued

Pooled length frequency distributions (normalised to catch per nm²) of the two hake species grouped by the shelf and slope area are shown in Figure 15.

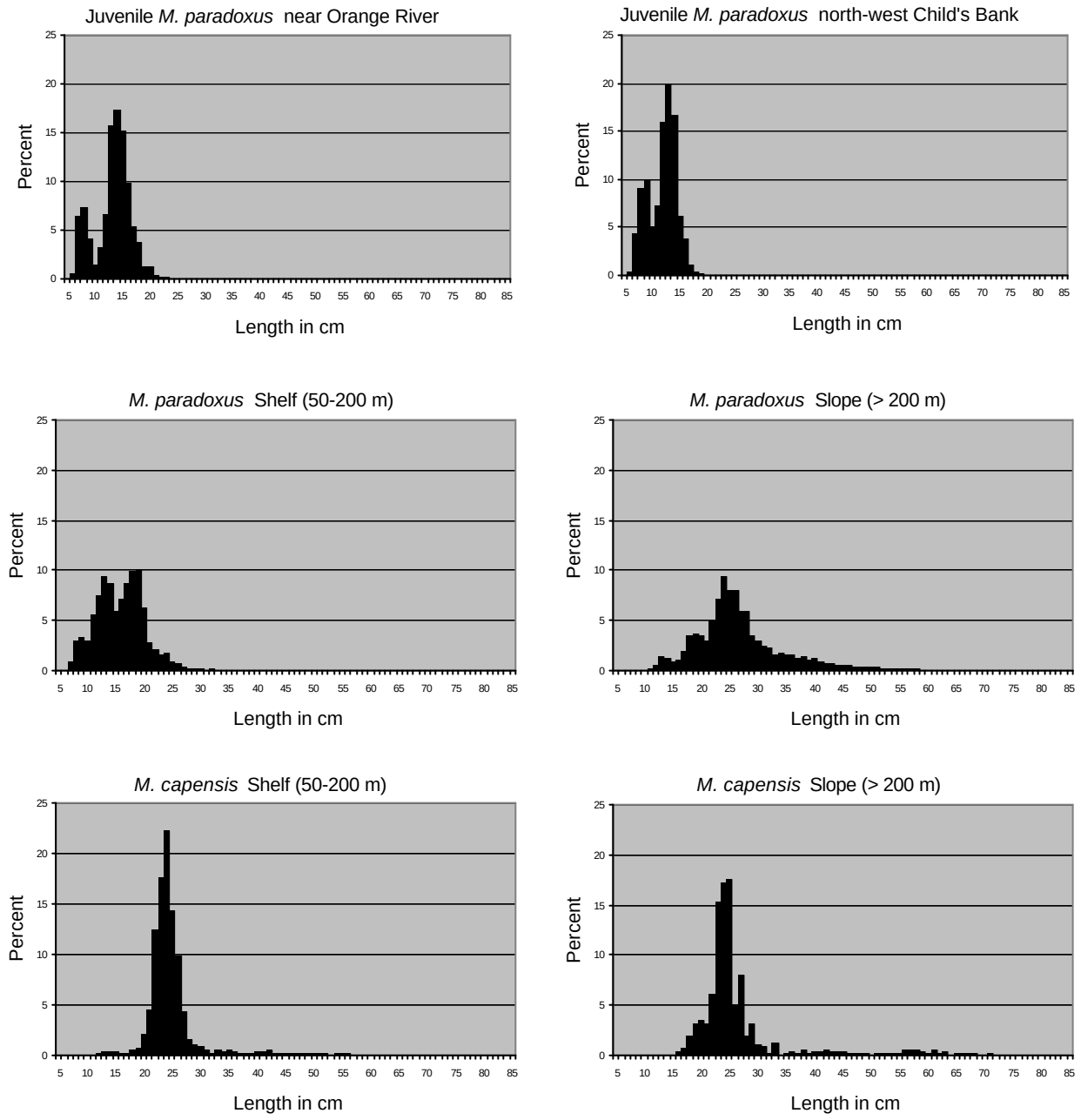

Figure 15 Pooled length frequencies of hake.

5 Consideration of the survey result

The main objective of the survey was to shed more light upon the question on how the deep water hake (*M. paradoxus*) populates Namibian waters. Two working hypotheses were raised in the introduction of the report: 1) populating through migration of adults following the slope northwards from South-Africa, or 2) populating by migration/diffusion of juveniles across the shelf from Hondeklip Bay area and into Namibia north to Luderitz where the juveniles gradually mix with the adults as the former grows into adulthood and descends into deeper waters.

The present survey confirms earlier findings that the center of distribution of the youngest stages (5-10cm) is south of Orange River, i.e. in South African waters.

However contrary to earlier perceptions, at least some young fish seems to use a mid-shelf channel to diffuse northwards into Namibia, onto where the shelf narrows at 28°S. This is strongly indicated by the 11 – 15 cm size class.

The adult fish on the slope are distributed as a continuous band between South-Africa and Namibia at depth ranges from 300 to 600 m, suggesting an open channel for migration.

An analysis of the hydrographical features in February and April confirms that the shelf areas between Orange River and 28°S is highly dynamic with varying origin of the water masses. This supports the concept that the water masses temporarily may form a barrier for the fish on the shelf.

At present, none of the hypotheses are rejected, and it could be that both migration routes could be important features of the populating mechanism.

The forthcoming survey in August-September should add further information to this picture. It is expected that this survey will shed more light on the slope migration as the hake then enters its main spawning period and is expected to have more active migration.

The importance of the second hypothesis should also be checked by consulting historical data on the ratio between juvenile and adult hake in Namibia and South Africa separately. If the ratio is an order of magnitude less in Namibia, compared to South Africa, it will indicate that diffusion of juveniles into the Namibian adult component is a less important recruitment mechanism than active migration along the slope from South Africa (first hypothesis).

Annex I Records of fishing stations

PROJECT STATION: 806

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2722
start stop duration Long E 1514
TIME :06:30:08 06:52:48 23 (min) Purpose code:
LOG : 861.91 863.06 1.14 Area code :
FDEPTH: 117 115 GearCond.code:
BDEPTH: 117 115 Validity code:
Towing dir: 150ø Wire out: 330 m Speed: 30 kn*10

Sorted: Kg Total catch: 34.05 CATCH/HOUR: 88.83

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	38.35	459 43.17	6878
Chelidonichthys capensis	20.87	68 23.49	6883
Callorhinchus capensis	9.13	5 10.28	
Etrumeus whiteheadi	6.39	128 7.19	
Sufflogobius bibarbatus	5.22	292 5.88	
Genypterus capensis	3.13	21 3.52	6882
Octopus vulgaris	2.24	2.52	
Austroglossus microlepis	1.30	8 1.46	6880
Todaropsis eblanae	0.89	31 1.00	6884
Sepia australis	0.70	31 0.79	
Trachurus trachurus	0.18	3 0.20	6881
Macropipus sp.	0.16	8 0.18	
Zeus capensis	0.13	8 0.15	6879
Lolligoncula mercatoris	0.08	29 0.09	
Squilla sp.	0.03	3 0.03	
Congiopodus spinifer	0.03	3 0.03	
Total	88.83	99.98	

PROJECT STATION: 807

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2724
start stop duration Long E 1505
TIME :08:32:03 09:03:12 31 (min) Purpose code:
LOG : 874.39 875.94 1.55 Area code :
FDEPTH: 163 166 GearCond.code:
BDEPTH: 163 166 Validity code:
Towing dir: 330ø Wire out: 480 m Speed: 30 kn*10

Sorted: Kg Total catch: 306.37 CATCH/HOUR: 592.98

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	375.48	3900 63.32	6885
Etrumeus whiteheadi	98.71	16.65	
Chelidonichthys capensis	54.19	170 9.14	6890
Galeorhinus galeus	32.90	2 5.55	
Callorhinchus capensis	12.39	8 2.09	
Todaropsis eblanae	5.81	155 0.98	6892
Thyrsites atun	5.03	2 0.85	6888
Genypterus capensis	3.29	23 0.55	6889
Todaropsis eblanae	1.94	50 0.33	6891
Austroglossus microlepis	1.94	2 0.33	6886
Sepia australis	0.52	25 0.09	
Macropipus sp.	0.33	14 0.06	
Trachurus trachurus	0.25	4 0.04	6887
Lolligoncula mercatoris	0.12	54 0.02	
Sufflogobius bibarbatus	0.08	6 0.01	
Total	592.98	100.01	

PROJECT STATION: 808

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2729
start stop duration Long E 1458
TIME :10:36:14 11:06:05 30 (min) Purpose code:
LOG : 885.54 887.05 1.51 Area code :
FDEPTH: 245 241 GearCond.code:
BDEPTH: 245 241 Validity code:
Towing dir: 170ø Wire out: 680 m Speed: 30 kn*10

Sorted: Kg Total catch: 314.39 CATCH/HOUR: 628.78

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	402.00	5560 63.93	6894
Merluccius capensis	62.00	108 9.86	6893
Thyrsites atun	27.00	20 4.29	6897
Raja pullopunctata	18.00	2 2.86	
Chelidonichthys capensis	12.00	16 1.91	6899
Raja straeleni	12.00	8 1.91	
Coelorinchus simorynchus	11.00	144 1.75	
Genypterus capensis	10.40	40 1.65	6898
Raja wallacei	10.00	4 1.59	
Mustelus mustelus	10.00	1.59	
Sufflogobius bibarbatus	9.20	1.46	
Trachurus trachurus	8.00	32 1.27	6896
Austroglossus microlepis	7.60	24 1.21	6895
Squalus megalops	6.60	16 1.05	
Sepia australis	5.00	0.80	
Lepidopus caudatus	5.00	82 0.80	
Todaropsis eblanae	4.50	120 0.72	6901
Todaropsis eblanae	4.00	108 0.64	6900
Holohalaelurus regani	3.40	10 0.54	
Etrumeus whiteheadi	0.78	14 0.12	
Chlorophthalmus agassizi	0.20	18 0.03	
Exodromidia sp.	0.02	2	
Lolligoncula mercatoris	0.02	12	
Helicolenus dactylopterus	0.02	4	
Symbolophorus boops	0.02	2	
Maurolicus muelleri	0.02	14	
Lampanyctodes hectoris	0.00	4	
Total	628.78	99.98	

PROJECT STATION: 809

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2733
start stop duration Long E 1448
TIME :12:52:44 13:22:30 30 (min) Purpose code:
LOG : 898.01 899.55 1.53 Area code :
FDEPTH: 323 327 GearCond.code:
BDEPTH: 323 327 Validity code:
Towing dir: 160ø Wire out: 900 m Speed: 30 kn*10

Sorted: Kg Total catch: 1629.71 CATCH/HOUR: 3259.42

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trachurus	2718.00	7038 83.39	6904
Merluccius paradoxus	352.00	3196 10.80	6902
Merluccius paradoxus	96.00	162 2.95	6903
Brama brama	40.00	32 1.23	6905
Lepidopus caudatus	14.00	16 0.43	
Symbolophorus boops	7.40	0.23	
Squilla sp.	6.60	734 0.20	
Todaropsis eblanae	6.00	82 0.18	6909
Genypterus capensis	6.00	10 0.18	6907
Thyrsites atun	4.40	2 0.13	6906
Todarodes angolensis - females	4.00	6 0.12	6911
Coelorinchus simorynchus	2.00	0.06	
Todarodes angolensis - males	1.16	2 0.04	6910
Helicolenus dactylopterus	0.88	14 0.03	6908
Lampanyctodes hectoris	0.40	0.01	
Maurolicus muelleri	0.40	0.01	
Epigonus sp.	0.10	2	
Malacocephalus laevis	0.06	2	
Macropipus sp.	0.02	4	
Total	3259.42	99.99	

PROJECT STATION: 810

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2734
start stop duration Long E 1442
TIME :14:47:16 15:17:11 30 (min) Purpose code:
LOG : 906.62 908.22 1.59 Area code :
FDEPTH: 342 344 GearCond.code:
BDEPTH: 342 344 Validity code:
Towing dir: 330ø Wire out: 950 m Speed: 32 kn*10

Sorted: Kg Total catch: 3692.01 CATCH/HOUR: 7384.02

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trachurus	4712.00	16760 63.81	6915
Lepidopus caudatus	2102.00	28.47	
Merluccius paradoxus	405.00	5280 5.48	6913
Thyrsites atun	86.00	60 1.16	6916
Merluccius capensis	30.00	18 0.41	6912
Helicolenus dactylopterus	15.00	120 0.20	6918
Coelorinchus simorynchus	10.20	0.14	
Todaropsis eblanae	7.20	88 0.10	6920
Lophius vomerinus	6.00	2 0.08	6919
Merluccius paradoxus	6.00	8 0.08	6914
Todarodes angolensis - females	2.66	2 0.04	6921
Genypterus capensis	1.66	4 0.02	6917
Squilla sp.	0.30		
Total	7384.02	99.99	

PROJECT STATION: 811

DATE:21/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2740
start stop duration Long E 1433
TIME :16:49:44 17:11:16 22 (min) Purpose code:
LOG : 920.49 921.58 1.10 Area code :
FDEPTH: 446 445 GearCond.code:
BDEPTH: 446 445 Validity code:
Towing dir: 155ø Wire out:1180 m Speed: 30 kn*10

Sorted: Kg Total catch: 56.68 CATCH/HOUR: 154.57

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	54.55	145 35.29	6922
Merluccius paradoxus	43.64	300 28.23	6923
Coelorinchus simorynchus	27.27	17.64	
Genypterus capensis	13.64	5 8.82	6924
Todarodes angolensis - males	5.15	8 3.33	6925
Todarodes angolensis - females	2.48	3 1.60	6926
Coelorinchus braueri	1.99	150 1.29	
Selachophidium guentheri	1.91	63 1.24	
Etmopterus sp.	1.12	8 0.72	
Photichthys argenteus	0.85	82 0.55	
Funchalia woodwardi	0.57	0.37	
Lycoteuthis diadema *	0.27	16 0.17	
Malacocephalus laevis	0.25	5 0.16	
Lucigadus ori	0.22	22 0.14	
Myctophum sp.	0.14	14 0.09	
Shrimps, small, non comm.	0.11	0.07	
Squilla sp.	0.11	0.07	
Symbolophorus boops	0.11	11 0.07	
Physiculus capensis	0.05	5 0.03	
MYCTOPHIDAE	0.05	0.03	
Stereomastis sp.	0.03	14 0.02	
Epigonus sp.	0.03	3 0.02	
Lestidiops sp.	0.03	0.02	
Hoplostethus mediterraneus	0.00	3	
Total	154.57	99.97	

PROJECT STATION: 812

DATE:22/ 4/04 GEAR TYPE: BT No: 8 POSITION:Lat S 2822
start stop duration Long E 1449
TIME :05:22:39 05:52:25 30 (min) Purpose code:
LOG : 969.00 970.46 1.46 Area code :
FDEPTH: 194 197 GearCond.code:
BDEPTH: 194 197 Validity code:
Towing dir: 340ø Wire out: 560 m Speed: 30 kn*10
Sorted: Kg Total catch: 392.55 CATCH/HOUR: 785.10

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	306.00	18044 38.98	6929
Merluccius capensis	185.36	308 23.61	6927
Sepia australis	81.00		10.32
Chelidonichthys capensis	38.00	90 4.84	6937
Galeorhinus galeus	26.00	2	3.31
Lophius vomerinus	20.00	36 2.55	6939
Holohalaelurus regani	19.00	72	2.42
Trachurus trachurus	18.00	110 2.29	6933
Etrumeus whiteheadi	12.60	162	1.60
Genypterus capensis	12.00	48 1.53	6935
Thyrsites atun	12.00	8 1.53	6934
Raja straeleni	12.00	10	1.53
Paracallionymus costatus	8.18		1.04
Coelorinchus simorynchus	7.02		0.89
Merluccius capensis	6.64	2 0.85	6928
Merluccius paradoxus	4.00	12 0.51	6930
Zeus capensis	3.14	90 0.40	6931
Todarodes angolensis - females	3.00	4 0.38	6940
Squalus megalops	2.80	6	0.36
Todaropsis eblanae	1.88	62	0.24
Callorhinchus capensis	1.70	2	0.22
Chelidonichthys queketti	1.54	8 0.20	6938
Helicolenus dactylopterus	0.90	214 0.11	6936
Congiopodus spinifer	0.70	4	0.09
Cynoglossus zanzibarensis	0.64	28 0.08	6932
Lepidopus caudatus	0.54	10	0.07
Sepia hieronis	0.22	8	0.03
Sufflogobius bibarbatus	0.12	20	0.02
Lolliguncula mercatoris	0.08	36	0.01
Notopogon macrosolen	0.04	8	0.01
Total	785.10		100.02

PROJECT STATION: 813

DATE:22/ 4/04 GEAR TYPE: BT No:14 POSITION:Lat S 2819
start stop duration Long E 1457
TIME :07:29:12 07:52:10 23 (min) Purpose code:
LOG : 980.21 981.43 1.20 Area code :
FDEPTH: 183 181 GearCond.code:
BDEPTH: 183 181 Validity code:
Towing dir: 135ø Wire out: 550 m Speed: 30 kn*10
Sorted: Kg Total catch: 278.36 CATCH/HOUR: 726.16

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	362.61	3503 49.94	6941
Merluccius paradoxus, juvenile	74.61	5859 10.27	6944
Merluccius paradoxus	70.43	1273 9.70	6943
Merluccius capensis	54.78	86 7.54	6942
Sepia australis	49.57		6.83
Etrumeus whiteheadi	35.48	446	4.89
Chelidonichthys capensis	16.43	42 2.26	6950
Callorhinchus capensis	10.43	8	1.44
Lophius vomerinus	7.83	5 1.08	6952
Trachurus trachurus	7.04	42 0.97	6947
Genypterus capensis	6.26	10 0.86	6948
Zeus capensis	4.96	21 0.68	6945
Helicolenus dactylopterus	4.43	91 0.61	6949
Chelidonichthys queketti	3.91	23 0.54	6951
Coelorinchus simorynchus	3.13	29	0.43
Lepidopus caudatus	2.77	42	0.38
Raja wallacei	2.61	3	0.36
Raja straeleni	2.61	3	0.36
Holohalaelurus regani	2.22	8	0.31
Todaropsis eblanae	1.41	34 0.19	6953
Congiopodus spinifer	1.20	3	0.17
Cynoglossus zanzibarensis	0.70	5 0.10	6946
Macropipus sp.	0.29	8	0.04
Sufflogobius bibarbatus	0.26	50	0.04
Paracallionymus costatus	0.10	37	0.01
Lolliguncula mercatoris	0.03	21	
Lampanyctodes hectoris	0.03		
Maurolicus muelleri	0.03		
Total	726.16		100.00

PROJECT STATION: 814

DATE:22/ 4/04 GEAR TYPE: BT No:14 POSITION:Lat S 2816
start stop duration Long E 1506
TIME :10:19:00 10:49:40 31 (min) Purpose code:
LOG : 996.09 996.09 Area code :
FDEPTH: 180 180 GearCond.code:
BDEPTH: 180 180 Validity code:
Towing dir: 235ø Wire out: 550 m Speed: 30 kn*10
Sorted: Kg Total catch: 630.84 CATCH/HOUR: 1220.98

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	375.48	4334 30.75	6954
Lepidopus caudatus	191.61		15.69
Merluccius paradoxus	124.84	6677 10.22	6956
Etrumeus whiteheadi	106.45		8.72
Merluccius capensis	104.52	166 8.56	6955
Thyrsites atun	92.90	52 7.61	6959
Sepia australis	60.58		4.96
Chelidonichthys capensis	37.74	97 3.09	6962
Raja pullopunctata	23.23	2	1.90
Galeorhinus galeus	23.23	2	1.90
Callorhinchus capensis	15.48	8	1.27
Galeorhinus galeus	13.55	2	1.11
Genypterus capensis	12.58	14 1.03	6960
Lophius vomerinus	8.48	23 0.69	6964
Todarodes angolensis	4.14		0.34
Paracallionymus costatus	3.95	654	0.32
Todaropsis eblanae	3.68		0.30
Raja straeleni	2.71	4	0.22
Cynoglossus zanzibarensis	2.69	27 0.22	6958
Macropipus sp.	2.42	97	0.20
Squilla sp.	1.94	213	0.16
Chelidonichthys queketti	1.94	12 0.16	6963
Coelorinchus simorynchus	1.43	29	0.12
Todarodes angolensis - males	1.05	2 0.09	6967
Helicolenus dactylopterus	0.97	105 0.08	6961
Zeus capensis	0.68	37 0.06	6957
Todaropsis eblanae	0.50	8 0.04	6965
Lolliguncula mercatoris	0.46	221	0.04
Todaropsis eblanae	0.43	8 0.04	6966
Scyliorhinus capensis	0.43	2	0.04
Holohalaelurus regani	0.33	2	0.03
Trachurus trachurus	0.25		0.02
Sepia hieronis	0.15	19	0.01
Champsodon capensis	0.10	8	0.01
Sufflogobius bibarbatus	0.06		
Total	1220.98		100.00

PROJECT STATION: 815

DATE:22/ 4/04 GEAR TYPE: BT No:14 POSITION:Lat S 2803
start stop duration Long E 1535
TIME :15:07:57 15:29:40 22 (min) Purpose code:
LOG :1031.93 1033.06 1.10 Area code :
FDEPTH: 92 92 GearCond.code:
BDEPTH: 92 92 Validity code:
Towing dir: 245ø Wire out: 305 m Speed: 30 kn*10

Sorted: Kg Total catch: 55.54 CATCH/HOUR: 151.47

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Chelidonichthys capensis	46.36	185 30.61	6975
Sepia australis	30.00		19.81
Merluccius capensis	23.18	237 15.30	6968
Exodromidia sp.	16.36		10.80
Genypterus capensis	10.91	5 7.20	6974
C R A B S	5.45		3.60
Raja straeleni	5.05	3	3.33
Squilla sp.	2.59	278	1.71
Macropipus sp.	2.35	155	1.55
Lolliguncula mercatoris	2.05		1.35
Mursia cristimanus	1.85	87	1.22
Austroglossus microlepis	1.23	8 0.81	6970
Etrumeus whiteheadi	0.93	16	0.61
Todaropsis eblanae	0.90	33 0.59	6977
Thyrsites atun	0.38	3 0.25	6973
Todaropsis eblanae	0.35	16 0.23	6976
Lepidopus caudatus	0.35	27	0.23
Zeus capensis	0.33	46 0.22	6969
Trachurus trachurus	0.30	3 0.20	6972
Cynoglossus zanzibarensis	0.27	3 0.18	6971
Sardinops ocellatus	0.22	3	0.15
Congiopodus spinifer	0.03		0.02
Sufflogobius bibarbatus	0.03	35	0.02
Total	151.47		99.99

PROJECT STATION: 816

DATE:23/ 4/04 GEAR TYPE: BT No:14 POSITION:Lat S 2848
start stop duration Long E 1620
TIME :05:25:56 05:30:03 4 (min) Purpose code:
LOG :1103.48 1103.66 0.17 Area code :
FDEPTH: 84 84 GearCond.code:
BDEPTH: 84 84 Validity code:
Towing dir: 140ø Wire out: 270 m Speed: 30 kn*10

Sorted: Kg Total catch: 198.37 CATCH/HOUR: 2975.55

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	2505.00	21435 84.19	6978
J E L L Y F I S H	285.00		9.58
Austroglossus microlepis	69.00	555 2.32	6980
Chelidonichthys capensis	43.50	375 1.46	6981
Merluccius capensis, juveniles	18.00	420 0.60	6979
Shrimps, small, non comm.	15.00		0.50
Etrumeus whiteheadi	15.00		0.50
Lolliguncula mercatoris	7.50		0.25
Engraulis capensis	7.50	2145	0.25
C R A B S	7.35		0.25
Sufflogobius bibarbatus	1.05	585	0.04
Macropipus sp.	0.75	105	0.03
Squilla sp.	0.60	60	0.02
Exodromidia sp.	0.15	15	0.01
Todaropsis eblanae	0.15	15 0.01	6982
Trachurus trachurus	0.00	15	
Total	2975.55		100.01

PROJECT STATION: 817

DATE:23/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2855
start stop duration Long E 1605
TIME :08:05:40 08:35:39 30 (min) Purpose code:
LOG :1121.67 1123.19 1.50 Area code :
FDEPTH: 150 149 GearCond.code:
BDEPTH: 150 149 Validity code:
Towing dir: 133ø Wire out: 440 m Speed: 30 kn*10

Sorted: Kg Total catch: 585.61 CATCH/HOUR: 1171.22

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus, juvenile	804.00	36894 68.65	6985
Sepia australis	68.00		5.81
Merluccius capensis	56.60	498 4.83	6983
Chelidonichthys capensis	39.00	128 3.33	6992
Merluccius capensis	34.00	92 2.90	6984
Lophius vomerinus	27.60	140 2.36	6993
Cynoglossus zanzibarensis	22.60	710 1.93	6986
Paracallionymus costatus	19.20	948	1.64
Etrumeus whiteheadi	19.20	294	1.64
Raja straeleni	16.00	8	1.37
Callorhinchus capensis	14.00	4	1.20
Thyrsites atun	12.00	12 1.02	6988
Genypterus capensis	7.66	80 0.65	6989
Macropipus sp.	6.80	170	0.58
Genypterus capensis	6.56	4 0.56	6990
Coelorinchus simorynchus	5.10	226	0.44
Squilla sp.	4.42	362	0.38
Trachurus trachurus	3.02	12 0.26	6987
Todaropsis eblanae	2.20	120 0.19	6994
Maurolicus muelleri	1.00		0.09
Lolliguncula mercatoris	0.70	3930	0.06
Sufflogobius bibarbatus	0.54	136	0.05
Sepia hieronis	0.52	12	0.04
Sardinops ocellatus	0.26	12	0.02
Helicolenus dactylopterus	0.12	108 0.01	6991
Goneplax angulata	0.06	28	0.01
Lepidopus caudatus	0.06	12	0.01
Total	1171.22		100.03

PROJECT STATION: 818

DATE:23/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2900
start stop duration Long E 1551
TIME :10:42:30 11:13:36 31 (min) Purpose code:
LOG :1138.45 1140.08 1.46 Area code :
FDEPTH: 175 176 GearCond.code:
BDEPTH: 175 176 Validity code:
Towing dir: 240ø Wire out: 600 m Speed: 30 kn*10

Sorted: Kg Total catch: 223.06 CATCH/HOUR: 431.72

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Etrumeus whiteheadi	108.39	25.11	
Merluccius capensis	46.45	343	10.76 6995
Merluccius paradoxus	44.52	1523	10.31 6997
Coelorinchus simorynchus	38.71	8.97	
Helicolenus dactylopterus	33.87	1707	7.85 7003
Sepia australis	25.16	5.83	
Thyrsites atun	19.94	19	4.62 7001
Merluccius capensis	18.00	29	4.17 6996
Chelidonichthys capensis	15.48	35	3.59 7004
Paracallionymus costatus	15.48	3.59	
Galeorhinus galeus	11.61	2	2.69
Raja straeleni	11.11	12	2.57
Lophius vomerinus	5.81	58	1.35 7006
Genypterus capensis	4.84	25	1.12 7002
Macropipus sp.	3.87	0.90	
Lolligoncula mercatoris	3.87	0.90	
Lepidopus caudatus	3.87	2	0.90
Cynoglossus zanzibarensis	3.87	165	0.90 6999
Mustelus palumbes	3.87	2	0.90
Holohalaelurus regani	3.87	110	0.90
Todaropsis eblanae	1.94	72	0.45 7009
Todaropsis eblanae	1.94	50	0.45 7008
Sepia hieronis	1.05	31	0.24
Zeus capensis	0.89	12	0.21 6998
Todaropsis eblanae	0.87	77	0.20 7007
Congiopodus spinifer	0.70	10	0.16
Trachurus trachurus	0.66	2	0.15 7000
Squilla sp.	0.25	23	0.06
Chelidonichthys queketti	0.25	4	0.06 7005
Maurolicus muelleri	0.19	0.04	
Sardinops ocellatus	0.17	2	0.04
Mursia cristimanus	0.08	6	0.02
Goneplax angulata	0.06	12	0.01
Exodromidia sp.	0.04	2	0.01
Physiculus capensis	0.04	4	0.01
Total	431.72		100.04

PROJECT STATION: 820

DATE:23/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2910
start stop duration Long E 1528
TIME :15:28:58 15:58:22 29 (min) Purpose code:
LOG :1169.51 1171.03 1.50 Area code :
FDEPTH: 185 186 GearCond.code:
BDEPTH: 185 186 Validity code:
Towing dir: 250ø Wire out: 600 m Speed: 30 kn*10

Sorted: Kg Total catch: 380.43 CATCH/HOUR: 787.10

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Emmelichthys nitidus	163.45	8172	20.77
Merluccius capensis	134.48	194	17.09 7025
Merluccius paradoxus, juvenile	120.00	8830	15.25 7028
Sepia australis	53.79	6.83	
Merluccius paradoxus	50.28	590	6.39 7026
Helicolenus dactylopterus	37.24	1719	4.73 7034
Chelidonichthys queketti	30.21	240	3.84 7036
Chelidonichthys capensis	28.97	70	3.68 7035
Thyrsites atun	24.00	14	3.05 7032
Lophius vomerinus	22.76	29	2.89 7037
Coelorinchus simorynchus	21.93	428	2.79
Etrumeus whiteheadi	21.93	329	2.79
Holohalaelurus regani	21.93	99	2.79
Callorhinchus capensis	8.28	4	1.05
Cynoglossus zanzibarensis	8.09	151	1.03 7030
Macropipus sp.	6.79	219	0.86
Zeus capensis	6.68	197	0.85 7029
Raja straeleni	6.21	4	0.79
Paracallionymus costatus	5.15	0.65	
Todaropsis eblanae	4.16	108	0.53 7038
Sepia hieronis	2.23	110	0.28
Lepidopus caudatus	2.07	0.26	
Trachurus trachurus	2.07	4	0.26 7031
Merluccius paradoxus	2.07	6	0.26 7027
Genypterus capensis	1.03	6	0.13 7033
Squilla sp.	0.52	66	0.07
Lolligoncula mercatoris	0.39	197	0.05
Maurolicus muelleri	0.21	0.03	
Champsodon capensis	0.12	10	0.02
Goneplax angulata	0.06	10	0.01
Total	787.10		100.02

PROJECT STATION: 819

DATE:23/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2903
start stop duration Long E 1542
TIME :12:45:08 13:16:48 32 (min) Purpose code:
LOG :1150.21 1151.95 1.71 Area code :
FDEPTH: 179 180 GearCond.code:
BDEPTH: 179 180 Validity code:
Towing dir: 700 Wire out: 600 m Speed: 32 kn*10

Sorted: Kg Total catch: 352.17 CATCH/HOUR: 660.31

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus, juvenile	168.75	7509	25.56 7013
Merluccius capensis	90.00	180	13.63 7011
Chelidonichthys capensis	63.75	184	9.65 7020
Paracallionymus costatus	63.75	9.65	
Etrumeus whiteheadi	48.75	696	7.38
Sepia australis	42.19	6.39	
Helicolenus dactylopterus	28.13	1519	4.26 7019
Merluccius paradoxus	21.94	236	3.32 7012
Cynoglossus zanzibarensis	20.63	583	3.12 7015
Merluccius capensis	20.63	144	3.12 7010
Lophius vomerinus	16.37	92	2.48 7022
Mustelus mustelus	15.00	2.27	
Coelorinchus simorynchus	14.06	358	2.13
Todaropsis eblanae	9.51	1.44	
Genypterus capensis	8.79	73	1.33 7018
Thyrsites atun	6.19	4	0.94 7017
Raja straeleni	5.63	9	0.85
Holohalaelurus regani	5.63	68	0.85
Trachurus trachurus	3.84	17	0.58 7016
Chelidonichthys queketti	1.88	13	0.28 7021
Todaropsis eblanae	1.41	32	0.21 7023
Sepia hieronis	1.16	36	0.18
Todaropsis eblanae	1.13	21	0.17 7024
Congiopodus spinifer	0.28	8	0.04
Squilla sp.	0.23	15	0.03
Macropipus sp.	0.19	8	0.03
Maurolicus muelleri	0.19	0.03	
Lolligoncula mercatoris	0.15	71	0.02
Mursia cristimanus	0.09	8	0.01
Goneplax angulata	0.04	8	0.01
Zeus capensis	0.02	6	7014
Total	660.31		99.96

PROJECT STATION: 821

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2918
start stop duration Long E 1504
TIME :05:24:41 05:54:31 30 (min) Purpose code:
LOG :1204.67 1206.23 1.54 Area code :
FDEPTH: 177 177 GearCond.code:
BDEPTH: 177 177 Validity code:
Towing dir: 280ø Wire out: 520 m Speed: 30 kn*10

Sorted: Kg Total catch: 424.16 CATCH/HOUR: 848.32

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trachurus	224.00	2604	26.41 7044
Merluccius capensis	164.00	208	19.33 7039
Chelidonichthys capensis	72.00	144	8.49 7048
Emmelichthys nitidus	60.00	3000	7.07
Helicolenus dactylopterus	50.00	3062	5.89 7047
Zeus capensis	50.00	370	5.89 7042
Lophius vomerinus	32.00	46	3.77 7050
Holohalaelurus regani	28.00	90	3.30
Chelidonichthys queketti	24.00	178	2.83 7049
Squalus megalops	24.00	72	2.83
Merluccius paradoxus, juvenile	20.00	6622	2.36 7041
Thyrsites atun	14.00	4	1.65 7045
Merluccius paradoxus	11.00	28	1.30 7040
Sepia australis	10.00	1.18	
Etrumeus whiteheadi	9.02	112	1.06
Congiopodus spinifer	8.82	1.04	
Callorhinchus capensis	8.00	4	0.94
Arnoglossus capensis	7.50	658	0.88
Mustelus palumbes	6.00	2	0.71
Cynoglossus zanzibarensis	5.48	40	0.65 7043
Genypterus capensis	4.00	6	0.47 7046
Lepidopus caudatus	4.00	0.47	
Scyliorhinus capensis	4.00	30	0.47
Todaropsis eblanae	2.54	70	0.30 7052
Paracallionymus costatus	2.54	690	0.30
Raja straeleni	2.00	2	0.24
Loligo vulgaris	1.26	2	0.15 7051
Squilla sp.	0.16	10	0.02
Total	848.32		100.00

PROJECT STATION: 822

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2922
start stop duration Long E 1455
TIME :07:22:02 07:53:25 31 (min) Purpose code:
LOG :1216.04 1217.61 1.56 Area code :
FDEPTH: 198 197 GearCond.code:
BDEPTH: 198 197 Validity code:
Towing dir: 335ø Wire out: 570 m Speed: 30 kn*10

Sorted: Kg Total catch: 447.06 CATCH/HOUR: 865.27

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Lepidopus caudatus	278.71	32.21	
Callorhinchus capensis	120.00	75 13.87	
Trachurus trachurus	87.10	778 10.07	7058
Merluccius capensis	77.42	60 8.95	7053
Thyrsites atun	69.68	35 8.05	7060
Zeus capensis	67.74	366 7.83	7056
Lophius vomerinus	30.97	41 3.58	7065
Chelidonichthys queketti	19.35	132 2.24	7064
Emmelichthys nitidus	19.35		2.24
Holohalaelurus regani	15.48	75	1.79
Squalus megalops	11.61	29	1.34
Sepia australis	9.68		1.12
Chelidonichthys capensis	8.71	12 1.01	7063
Brama brama	8.52	4 0.98	7059
Merluccius paradoxus	8.32	68 0.96	7054
Congiopodus spinifer	4.84		0.56
Cynoglossus zanzibarensis	3.87	31 0.45	7057
Arnoglossus capensis	3.87		0.45
Raja wallacei	3.87	4	0.45
Paracallionymus costatus	2.90		0.34
Genypterus capensis	2.52	4 0.29	7061
Raja straeleni	1.94	2	0.22
Parapagurus dimorphus	1.74		0.20
Helicolenus dactylopterus	1.61	252 0.19	7062
Todaropsis eblanae	1.32	21 0.15	7067
Todaropsis eblanae	0.89	19 0.10	7066
Gonorhynchus gonorhynchus	0.75	2	0.09
Etrumeus whiteheadi	0.70	8	0.08
Merluccius paradoxus, juvenile	0.68	93 0.08	7055
Malacocephalus laevis	0.62	2	0.07
Notopogon macrosolen	0.27	4	0.03
Rossia enigmatica	0.12	10	0.01
Macropipus sp.	0.06	2	0.01
Champsodon capensis	0.04	2	
Lolliguncula mercatoris	0.02	8	
Lampanyctodes hectoris	0.00	6	
Total	865.27		100.01

PROJECT STATION: 824

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2929
start stop duration Long E 1435
TIME :12:40:11 13:10:10 30 (min) Purpose code:
LOG :1249.97 1251.47 1.48 Area code :
FDEPTH: 432 430 GearCond.code:
BDEPTH: 432 430 Validity code:
Towing dir: 160ø Wire out:1150 m Speed: 30 kn*10

Sorted: Kg Total catch: 804.59 CATCH/HOUR: 1609.18

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	1092.00	5278 67.86	7083
Merluccius paradoxus	348.00	582 21.63	7084
Genypterus capensis	36.00	20 2.24	7085
Bassanago albescens	31.00	56	1.93
Lophius vomerinus	27.00	30 1.68	7087
Coelorinchus simorynchus	21.20		1.32
Rossia enigmatica	8.00		0.50
Helicolenus dactylopterus	8.00	36 0.50	7086
Merluccius capensis	6.00	2 0.37	7082
Symbolophorus boops	6.00	430	0.37
Lucigadus ori	4.00	364	0.25
Todarodes angolensis - males	3.80	6 0.24	7090
Lepidopus caudatus	3.40	4	0.21
Coelorinchus braueri	3.00	250	0.19
Malacocephalus laevis	2.40		0.15
Holohalaelurus regani	2.00	6	0.12
Epigonus sp.	1.56		0.10
Parapagurus pilosimanus	1.08		0.07
Todaropsis eblanae	1.04	8 0.06	7089
Tripterophycis gilchristi	0.80	32	0.05
Todaropsis eblanae	0.60	4 0.04	7088
Stereomastis sp.	0.54	132	0.03
Paracallionymus costatus	0.46	80	0.03
Myxine capensis	0.28	4	0.02
Lycoteuthis diadema *	0.22	36	0.01
Hoplostethus mediterraneus	0.14	76	0.01
Stoloteuthis sp.	0.12	44	0.01
Conger wilsoni	0.12	2	0.01
Photichthys argenteus	0.12	6	0.01
Shrimps, small, non comm.	0.06		
Psychrolutes macrocephalus	0.06	2	
Physiculus capensis	0.06	8	
Mursia cristimanus	0.04	4	
Selachophidium guentheri	0.04	6	
Funchalia woodwardi	0.02	2	
Lampanyctodes hectoris	0.02	16	
Bathynectes sp.	0.00	2	
Total	1609.18		100.01

PROJECT STATION: 823

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2922
start stop duration Long E 1438
TIME :10:49:30 11:19:28 30 (min) Purpose code:
LOG :1241.76 1243.23 1.46 Area code :
FDEPTH: 326 325 GearCond.code:
BDEPTH: 326 325 Validity code:
Towing dir: 150ø Wire out: 850 m Speed: 30 kn*10

Sorted: Kg Total catch: 627.20 CATCH/HOUR: 1254.40

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	394.00	2642 31.41	7069
Zeus capensis	184.00	302 14.67	7071
Malacocephalus laevis	146.00		11.64
Merluccius capensis	102.00	54 8.13	7068
Merluccius paradoxus	100.00	132 7.97	7070
Helicolenus dactylopterus	70.00	594 5.58	7077
Coelorinchus simorynchus	70.00		5.58
Epigonus sp.	66.00	1320	5.26
Holohalaelurus regani	46.00		3.67
Cynoglossus zanzibarensis	24.00	324 1.91	7072
Squalus megalops	14.00	24	1.12
Lepidopus caudatus	6.00	14	0.48
Galeus polli	6.00	34	0.48
Thyrsites atun	5.40	2 0.43	7075
Todaropsis eblanae	5.18	48 0.41	7080
Todaropsis eblanae	4.44	44 0.35	7079
Lophius vomerinus	2.30	2 0.18	7078
Brama brama	1.90	2 0.15	7074
Rossia enigmatica	1.62	70	0.13
Genypterus capensis	1.38	0.11	7076
Trachurus trachurus	1.10	10 0.09	7073
Todarodes angolensis - males	0.94	0.07	7081
Bathynectes sp.	0.56	20	0.04
Scyliorhinus capensis	0.48	2	0.04
Beryx splendens	0.26	2	0.02
Sepia hieronis	0.20	4	0.02
Cyttus traversi	0.18	12	0.01
Selachophidium guentheri	0.10	2	0.01
Paracallionymus costatus	0.10	92	0.01
Lampanyctodes hectoris	0.08	62	0.01
Symbolophorus boops	0.06		
Goneplax angulata	0.04	2	
Sepia sp. New SA	0.04	10	
Arnoglossus capensis	0.04	2	
Squilla sp.	0.00	4	
Sepia typica	0.00	2	
Total	1254.40		99.98

PROJECT STATION: 825

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2931
start stop duration Long E 1432
TIME :14:37:02 15:06:59 30 (min) Purpose code:
LOG :1257.85 1259.39 1.53 Area code :
FDEPTH: 525 521 GearCond.code:
BDEPTH: 525 521 Validity code:
Towing dir: 350ø Wire out:1350 m Speed: 30 kn*10

Sorted: Kg Total catch: 136.35 CATCH/HOUR: 272.70

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	92.00	132 33.74	7092
Merluccius paradoxus	70.00	386 25.67	7091
Selachophidium guentheri	28.00	840	10.27
Etmopterus sp.	26.00	842	9.53
Nezumia sp.	8.00	240	2.93
Coelorinchus braueri	8.00	160	2.93
Myxine capensis	6.20		2.27
Todarodes angolensis - females	5.00	4 1.83	7096
Funchalia woodwardi	4.00		1.47
Photichthys argenteus	3.32		1.22
Bassanago albescens	3.28	14	1.20
Todarodes angolensis - males	2.64	6 0.97	7095
Malacocephalus laevis	2.46	24	0.90
Rossia enigmatica	2.44		0.89
Psychrolutes macrocephalus	2.40		0.88
Coelorinchus matamua	1.60	14	0.59
Helicolenus dactylopterus	1.48	6 0.54	7093
Lithodes sp.	1.36	10	0.50
Sergestes sp.	1.08		0.40
Lophius vomerinus	1.06	6 0.39	7094
Stereomastis sp.	0.70		0.26
Lucigadus ori	0.60	50	0.22
Epigonus sp.	0.34	32	0.12
Chaceon chuni	0.26	4	0.10
Bathophilus longipinnis	0.14	2	0.05
Tripterophycis gilchristi	0.12	4	0.04
Bathynectes sp.	0.04	2	0.01
Parapagurus pilosimanus	0.04	2	0.01
Lycoteuthis diadema *	0.04	2	0.01
C R A B S	0.02		0.01
Champsodon capensis	0.02	2	0.01
Symbolophorus boops	0.02	2	0.01
Bathyraja smithii	0.02	2	0.01
Raja leopardus	0.02	2	0.01
Diaphus sp.	0.00	2	
MYCTOPHIDAE	0.00	6	
Total	272.70		99.99

PROJECT STATION: 826

DATE:24/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2922
start stop duration Long E 1432
TIME :16:14:46 16:44:21 30 (min) Purpose code:
LOG :1266.84 1268.43 1.57 Area code :
FDEPTH: 446 438 GearCond.code:
BDEPTH: 446 438 Validity code:
Towing dir: 345ø Wire out:1200 m Speed: 30 kn*10

Sorted: Kg Total catch: 121.30 CATCH/HOUR: 242.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	128.00	494	52.76	7098
Merluccius paradoxus	31.20	46	12.86	7099
Lophius vomerinus	12.16	10	5.01	7103
Bassanago albescens	10.00			4.12
Coelorinchus simorynchus	10.00			4.12
Merluccius capensis	8.80	2	3.63	7097
Helicolenus dactylopterus	7.00	40	2.89	7102
Genypterus capensis	6.60	4	2.72	7101
Myxine capensis	4.00			1.65
Stereomastis sp.	3.48			1.43
Rossia enigmatica	3.16			1.30
Etmopterus sp.	2.50			1.03
Coelorinchus braueri	2.32			0.96
Todarodes angolensis - females	2.00	2	0.82	7105
Lucigadus ori	2.00			0.82
Notacanthus sexspinis	1.74	32		0.72
Epigonus sp.	1.04			0.43
Malacocephalus laevis	0.66	16		0.27
Tripterophycis gilchristi	0.64	26		0.26
Parapagurus pilosimanus	0.60			0.25
Octopus vulgaris	0.60			0.25
Bathynectes sp.	0.58	20		0.24
Psychrolutes macrocephalus	0.54	10		0.22
Krill	0.52			0.21
Todaropsis eblanae	0.52	2	0.21	7104
Cynoglossus zanzibarensis	0.52	6	0.21	7100
Selachophidium guentheri	0.30	58		0.12
Funchalia woodwardi	0.28			0.12
Physiculus capensis	0.28	20		0.12
Paracallionymus costatus	0.20	30		0.08
Hoplostethus mediterraneus	0.20	260		0.08
Nezumia sp.	0.10	8		0.04
Photichthys argenteus	0.06	4		0.02
Lycoteuthis diadema *	0.00	2		
Total	242.60			99.97

PROJECT STATION: 827

DATE:25/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2913
start stop duration Long E 1429
TIME :05:30:35 06:01:13 31 (min) Purpose code:
LOG :1340.61 1342.18 1.55 Area code :
FDEPTH: 446 448 GearCond.code:
BDEPTH: 446 448 Validity code:
Towing dir: 345ø Wire out:1280 m Speed: 30 kn*10

Sorted: Kg Total catch: 342.93 CATCH/HOUR: 663.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	329.03	639	49.57	7107
Merluccius paradoxus	189.68	1214	28.58	7106
Genypterus capensis	48.00	15	7.23	7109
Coelorinchus simorynchus	11.61			1.75
Octopus dofleini=magnifica	10.84			1.63
Bassanago albescens	7.74	10		1.17
Lophius vomerinus	6.39	2	0.96	7111
Helicolenus dactylopterus	6.19	29	0.93	7110
Todarodes angolensis - males	5.81	10	0.88	7114
Lucigadus ori	3.10			0.47
Rossia enigmatica	1.94			0.29
Photichthys argenteus	1.82			0.27
Todarodes angolensis - females	1.55	2	0.23	7115
Coelorinchus braueri	0.77	74		0.12
Todaropsis eblanae	0.56	4	0.08	7113
Bathynectes sp.	0.45	15		0.07
Etmopterus sp.	0.39	33		0.06
Todaropsis eblanae	0.37	2	0.06	7112
Epigonus sp.	0.27			0.04
Merluccius paradoxus, juvenile	0.27	10	0.04	7108
Lycoteuthis diadema *	0.25	19		0.04
Tripterophycis gilchristi	0.25	19		0.04
Malacocephalus laevis	0.25			0.04
Paracallionymus costatus	0.21	31		0.03
Stereomastis sp.	0.19	41		0.03
Physiculus capensis	0.19	12		0.03
Ophichthus bennettai	0.14	2		0.02
Psychrolutes macrocephalus	0.12	8		0.02
Hoplostethus mediterraneus	0.12	46		0.02
Chaunax pictus	0.08	4		0.01
Selachophidium guentheri	0.06	12		0.01
Funchalia woodwardi	0.04			0.01
Diaphus sp.	0.04	17		0.01
MYCTOPHIDAE	0.04	14		0.01
Myxine capensis	0.04			0.01
Rochinia sp.	0.02			
Stoloteuthis sp.	0.02	10		
Nezumia sp.	0.02	2		
Symbolophorus boops	0.02	2		
Maurolicus muelleri	0.02			
Krill	0.00			
Electrona risso	0.00	2		
Total	628.90			94.76

PROJECT STATION: 828

DATE:25/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2902
start stop duration Long E 1424
TIME :07:53:31 08:23:21 30 (min) Purpose code:
LOG :1353.43 1355.02 1.58 Area code :
FDEPTH: 484 486 GearCond.code:
BDEPTH: 484 486 Validity code:
Towing dir: 355ø Wire out:1280 m Speed: 30 kn*10

Sorted: Kg Total catch: 720.63 CATCH/HOUR: 1441.26

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	1094.00	1108	75.91	7117
Merluccius paradoxus	112.00	494	7.77	7116
Coelorinchus simorynchus	106.00			7.35
Genypterus capensis	42.00	24	2.91	7118
Lophius vomerinus	24.00	4	1.67	7120
Bassanago albescens	12.32	50		0.85
Helicolenus dactylopterus	12.00	28	0.83	7119
Cruriraja parcomaculata	8.00	8		0.56
Lucigadus ori	3.72			0.26
Todaropsis eblanae	3.52	18	0.24	7121
Lucigadus ori	3.12	18		0.22
Todarodes angolensis - males	2.58	4	0.18	7122
Todarodes angolensis - females	2.50	2	0.17	7123
Lycoteuthis diadema *	1.96	142		0.14
Funchalia woodwardi	1.80			0.12
Symbolophorus boops	1.74	136		0.12
Malacocephalus laevis	1.70	24		0.12
Selachophidium guentheri	1.48	24		0.10
Rossia enigmatica	1.44			0.10
Photichthys argenteus	1.00			0.07
Epigonus sp.	0.88	48		0.06
Parapagurus pilosimanus	0.70			0.05
Tripterophycis gilchristi	0.62	22		0.04
Coelorinchus braueri	0.48	78		0.03
Physiculus capensis	0.42	28		0.03
Coelorinchus matamua	0.42	4		0.03
Psychrolutes macrocephalus	0.24	2		0.02
Bathophilus longipinnis	0.18	4		0.01
Bathynectes sp.	0.08	2		0.01
Stereomastis sp.	0.06	14		
Diaphus sp.	0.06	18		
MYCTOPHIDAE	0.06			
Rochinia sp.	0.04			
Hoplostethus mediterraneus	0.04	8		
Diaphus effulgens	0.04	4		
Stoloteuthis sp.	0.02	6		
Electrona risso	0.02	6		
Argyropelecus aculeatus *	0.02	2		
Abraliopsis gilchristi	0.00	2		
Total	1441.26			99.97

PROJECT STATION: 829

DATE:25/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2901
start stop duration Long E 1428
TIME :10:05:08 10:30:03 25 (min) Purpose code:
LOG :1363.96 1365.23 1.26 Area code :
FDEPTH: 332 335 GearCond.code:
BDEPTH: 332 335 Validity code:
Towing dir: 350ø Wire out: 920 m Speed: 30 kn*10

Sorted: Kg Total catch: 742.09 CATCH/HOUR: 1781.02

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Epigonus sp.	393.60			22.10
Merluccius paradoxus	355.20	3115	19.94	7125
Lepidopus caudatus	182.40			10.24
Merluccius capensis	180.00	120	10.11	7124
Zeus capensis	177.60	360	9.97	7127
Helicolenus dactylopterus	153.60	802	8.62	7132
Coelorinchus simorynchus	103.20			5.79
Merluccius paradoxus	79.20	84	4.45	7126
Holohalaelurus regani	31.20			1.75
Parapagurus dimorphus	24.00			1.35
Genypterus capensis	19.20	19	1.08	7131
Malacocephalus laevis	19.20			1.08
Todaropsis eblanae	15.60	142	0.88	7134
Scyliorhinus capensis	7.20	7		0.40
Cruriraja parcomaculata	6.00	7		0.34
Todaropsis eblanae	5.81	46	0.33	7135
Thyrsites atun	5.52	2	0.31	7130
Lophius vomerinus	4.80	2	0.27	7133
Cynoglossus zanzibarensis	4.32	72	0.24	7128
Brama brama	3.60	2	0.20	7129
Squalus megalops	3.36	5		0.19
Paracallionymus costatus	1.63	12		0.09
Todarodes angolensis - females	1.39	2	0.08	7136
Emmelichthys nitidus	1.37	2		0.08
Galeus polli	0.72	5		0.04
Rossia enigmatica	0.55	36		0.03
Cyttus traversi	0.46	2		0.03
Parapagurus pilosimanus	0.10	5		0.01
Sepia hieronis	0.10	2		0.01
MERBA02	0.05	2		
Rochinia sp.	0.02	2		
Physiculus capensis	0.02	2		
Total	1781.02			100.01

PROJECT STATION: 830

DATE:25/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2854
start stop duration Long E 1424
TIME :12:19:15 12:49:25 30 (min) Purpose code:
LOG :1374.61 1376.21 1.59 Area code :
FDEPTH: 434 435 GearCond.code:
BDEPTH: 434 435 Validity code:
Towing dir: 350ø Wire out:1150 m Speed: 30 kn*10

Sorted: Kg Total catch: 613.73 CATCH/HOUR: 1227.46

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	358.00	670	29.17	7138
Merluccius paradoxus	250.00	1346	20.37	7137
Epigonus sp.	142.00		11.57	
Coelorinchus simorynchus	106.00		8.64	
Helicolenus dactylopterus	76.00	182	6.19	7142
Genypterus capensis	60.00	28	4.89	7141
Zeus capensis	48.00	56	3.91	7139
Lophius vomerinus	42.00	14	3.42	7143
Brama brama	38.00	26	3.10	7140
Lepidopus caudatus	34.00		2.77	
Cruriraja parcomaculata	22.00	18	1.79	
Scyliorhinus capensis	14.00	14	1.14	
Todarodes angolensis - females	6.40	6	0.52	7147
Malacocephalus laevis	6.00		0.49	
Todarodes angolensis - males	4.20	8	0.34	7146
Parapagurus pilosimanus	4.00		0.33	
Raja leopardus	3.00	6	0.24	
Lucigadus ori	2.60		0.21	
Holohalaelurus regani	2.00	6	0.16	
Beryx splendens	1.80	8	0.15	
Todaropsis eblanae	1.60	10	0.13	7145
Bassanago albescens	1.52	4	0.12	
Todaropsis eblanae	1.50	10	0.12	7144
Rossia enigmatica	0.80	28	0.07	
Physiculus capensis	0.76	54	0.06	
Galeus polli	0.38	4	0.03	
Bathynectes sp.	0.34	12	0.03	
Paracallionymus costatus	0.18	36	0.01	
Psychrolutes macrocephalus	0.08	6	0.01	
Tripterophycis gilchristi	0.06	4		
Symbolophorus boops	0.06	4		
Rochinia sp.	0.04	8		
Hoplostethus mediterraneus	0.04	10		
Stereomastis sp.	0.02	4		
Mursia cristimanus	0.02	2		
Sepia sp. New SA	0.02	4		
Abraliopsis gilchristi	0.02			
Diaphus effulgens	0.02	2		
Lycoteuthis diadema *	0.00	2		
Lampanyctodes hectoris	0.00	8		
Total	1227.46		99.98	

PROJECT STATION: 832

DATE:26/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2832
start stop duration Long E 1424
TIME :08:44:57 09:12:52 28 (min) Purpose code:
LOG :1436.38 1437.80 1.40 Area code :
FDEPTH: 449 442 GearCond.code:
BDEPTH: 449 442 Validity code:
Towing dir: 178ø Wire out:1260 m Speed: 30 kn*10

Sorted: Kg Total catch: 260.63 CATCH/HOUR: 558.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	233.57	257	41.82	7153
Merluccius paradoxus	109.29	572	19.57	7152
Genypterus capensis	98.57	47	17.65	7154
Coelorinchus simorynchus	51.43		9.21	
Rochinia sp.	11.79	7858	2.11	
Cruriraja parcomaculata	7.93	17	1.42	
Merluccius capensis	6.43	2	1.15	7151
Todarodes angolensis - males	5.98	13	1.07	7156
Notacanthus sexspinis	4.29		0.77	
Photichthys argenteus	4.29		0.77	
Lucigadus ori	3.64		0.65	
Rossia enigmatica	2.36		0.42	
Hydrolagus africanus	2.14	2	0.38	
Myxine capensis	1.97		0.35	
Todarodes angolensis - females	1.59	2	0.28	7157
Beryx splendens	1.39	9	0.25	
Lycoteuthis diadema *	1.22	103	0.22	
Sergestes sp.	1.07		0.19	
Bathynectes sp.	1.07		0.19	
Parapagurus pilosimanus	1.07		0.19	
Tripterophycis gilchristi	0.94	49	0.17	
Epigonus sp.	0.84	51	0.15	
Nezumia sp.	0.84	26	0.15	
Coelorinchus braueri	0.71	34	0.13	
Holohalaelurus regani	0.64	2	0.11	
Symbolophorus boops	0.62		0.11	
Galeus polli	0.47	4	0.08	
Malacocephalus laevis	0.45	13	0.08	
Etmopterus sp.	0.34		0.06	
Stoloteuthis sp.	0.30		0.05	
Ophichthus bennettai	0.28	2	0.05	
Psychrolutes macrocephalus	0.26	9	0.05	
MYCTOPHIDAE	0.17		0.03	
Stereomastis sp.	0.15	34	0.03	
Lophius vomerinus	0.13	9	0.02	7155
Raja spinacidermis	0.13		0.02	
Allocyttus verrucosus	0.11	2	0.02	
Hoplostethus mediterraneus	0.02	11		
Selachophidium guentheri	0.00	2		
Total	558.49		99.97	

PROJECT STATION: 831

DATE:26/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2834
start stop duration Long E 1420
TIME :05:38:04 06:08:51 31 (min) Purpose code:
LOG :1424.31 1426.07 1.76 Area code :
FDEPTH: 560 573 GearCond.code:
BDEPTH: 560 573 Validity code: 1
Towing dir: 12ø Wire out:1500 m Speed: 30 kn*10

Sorted: Kg Total catch: 78.63 CATCH/HOUR: 152.19

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	36.77	35	24.16	7148
Nezumia sp.	17.42		11.45	
Selachophidium guentheri	13.55		8.90	
Raja springeri	13.55	2	8.90	
Coelorinchus braueri	11.61		7.63	
Sergestes sp.	9.68		6.36	
Hydrolagus africanus	8.52		5.60	
Cruriraja parcomaculata	7.74	23	5.09	
Etmopterus sp.	6.00		3.94	
Notacanthus sexspinis	5.81	155	3.82	
Photichthys argenteus	3.87		2.54	
Raja leopardus	3.87	6	2.54	
Todarodes angolensis - females	1.94	2	1.27	7150
Bassanago albescens	1.94	8	1.27	
Neocyttus rhomboidalis	1.90	12	1.25	
Chaceon chuni	1.74	4	1.14	
Todarodes angolensis - males	1.74	2	1.14	7149
Psychrolutes macrocephalus	1.16	27	0.76	
Lycoteuthis diadema *	0.97	79	0.64	
Neoscopelus macrolepidotus	0.54	33	0.35	
Malacocephalus laevis	0.43	14	0.28	
Opisthoteuthis sp.	0.33	2	0.22	
Beryx splendens	0.27	2	0.18	
Caelorinchus sp.	0.19		0.12	
Lucigadus ori	0.15	12	0.10	
Allocyttus verrucosus	0.12		0.08	
Coelorinchus matamua	0.12	2	0.08	
Tripterophycis gilchristi	0.12	4	0.08	
Scopelosaurus meadi	0.06		0.04	
MYCTOPHIDAE	0.04	2	0.03	
Argentina euchus	0.04	2	0.03	
Total	152.19		99.99	

PROJECT STATION: 833

DATE:27/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2810
start stop duration Long E 1428
TIME :05:31:22 06:01:09 30 (min) Purpose code:
LOG :1500.76 1502.27 1.51 Area code :
FDEPTH: 560 561 GearCond.code:
BDEPTH: 560 561 Validity code:
Towing dir: 40ø Wire out:1500 m Speed: 30 kn*10

Sorted: Kg Total catch: 210.03 CATCH/HOUR: 420.06

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Coelorinchus braueri	158.00		37.61	
Nezumia sp.	122.00		29.04	
Merluccius paradoxus	32.00	22	7.62	7158
Raja leopardus	26.02	34	6.19	
Sergestes sp.	16.00		3.81	
Lophius vomerinus	9.04	2	2.15	7160
Notacanthus sexspinis	8.00	88	1.90	
Psychrolutes macrocephalus	6.80	74	1.62	
Selachophidium guentheri	5.00	64	1.19	
Lophius vomerinus	4.96	4	1.18	7159
Photichthys argenteus	4.00		0.95	
Etmopterus sp.	3.40	54	0.81	
Allocyttus verrucosus	2.62		0.62	
Lithodes sp.	2.42	16	0.58	
Rochinia sp.	2.00		0.48	
Cruriraja parcomaculata	2.00	6	0.48	
Myxine capensis	2.00		0.48	
Synaphobranchus kaupii	1.82		0.43	
Todarodes angolensis - females	1.80		0.43	7161
Parapagurus pilosimanus	1.44	70	0.34	
Hydrolagus africanus	1.30	2	0.31	
Neocyttus rhomboidalis	1.02		0.24	
Sergia sp.	1.00		0.24	
Hoplostethus atlanticus	1.00	4	0.24	
Coelorinchus matamua	0.90		0.21	
Antimora rostrata	0.84		0.20	
Lycoteuthis diadema *	0.56	42	0.13	
Lycodes sp.	0.40	2	0.10	
Gonostoma elongatum	0.38		0.09	
Careproctus griseldea	0.32		0.08	
Bathophilus longipinnis	0.20	6	0.05	
Octopoteuthis sp.	0.18	2	0.04	
Xenodermichthys copei	0.18		0.04	
Bathyuroconger vicinus	0.14	2	0.03	
Lucigadus ori	0.08		0.02	
MYCTOPHIDAE	0.08		0.02	
Bathypolypus valdiviae	0.04	2	0.01	
Nemichthys curvirostris	0.04	2	0.01	
Rossia enigmatica	0.02	2		
Lepidion capensis	0.02			
Scopelosaurus herwigi	0.02	2		
Lestidiops sp.	0.02			
Stereomastis sp.	0.00			
Total	420.06		99.97	

PROJECT STATION: 834

DATE:27/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2809
start stop duration Long E 1431
TIME :07:41:29 08:11:27 30 (min) Purpose code:
LOG :1507.98 1509.46 1.49 Area code :
FDEPTH: 467 469 GearCond.code:
BDEPTH: 467 469 Validity code:
Towing dir: 203ø Wire out:1250 m Speed: 30 kn*10

Sorted: Kg Total catch: 150.37 CATCH/HOUR: 300.74

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers		SAMP
Coelorinchus simorynchus	90.00		29.93	
Merluccius paradoxus	38.00	30	12.64	7163
Nezumia sp.	30.00		9.98	
Merluccius paradoxus	28.00	182	9.31	7162
Genypterus capensis	23.00	12	7.65	7164
Krill	16.00		5.32	
Parapagurus pilosimanus	16.00		5.32	
Etmopterus sp.	16.00		5.32	
Sergestes sp.	8.00		2.66	
Notacanthus sexspinis	6.00		2.00	
Raja leopardus	6.00	10	2.00	
Stereomastis sp.	3.20		1.06	
Photichthys argenteus	2.90	138	0.96	
Todarodes angolensis - males	2.80	6	0.93	7166
Todarodes angolensis - females	2.00	2	0.67	7167
Psychrolutes macrocephalus	2.00	20	0.67	
Coelorinchus braueri	2.00	54	0.67	
Lucigadus ori	1.70		0.57	
Myxine capensis	1.60		0.53	
Bassanago albescens	0.92	2	0.31	
Bathophilus longipinnis	0.78	14	0.26	
Malacocephalus laevis	0.70		0.23	
Bathophilus longipinnis	0.60	14	0.20	
Lycoteuthis diadema *	0.48	42	0.16	
Galeus polli	0.48	2	0.16	
Helicolenus dactylopterus	0.44	2	0.15	7165
Tripterophycis gilchristi	0.38	12	0.13	
Hoplostethus mediterraneus	0.16	42	0.05	
Allocyttus verrucosus	0.16	4	0.05	
Epigonus sp.	0.12	4	0.04	
Aristaeomorpha foliacea	0.06	2	0.02	
Gonostoma elongatum	0.06	2	0.02	
Rochinia sp.	0.04	4	0.01	
Rossia enigmatica	0.02	2	0.01	
Champsodon capensis	0.02	2	0.01	
Electrona risso	0.02	4	0.01	
Symbolophorus boops	0.02	2	0.01	
Diaphus sp.	0.02	4	0.01	
MYCTOPHIDAE	0.02		0.01	
Xenodermichthys copei	0.02	2	0.01	
Hydrolagus africanus	0.02	2	0.01	
Total	300.74		100.06	

PROJECT STATION: 836

DATE:27/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2817
start stop duration Long E 1427
TIME :12:23:47 12:54:13 30 (min) Purpose code:
LOG :1532.26 1533.85 1.57 Area code :
FDEPTH: 476 474 GearCond.code:
BDEPTH: 476 474 Validity code:
Towing dir: 20ø Wire out:1200 m Speed: 30 kn*10

Sorted: Kg Total catch: 133.56 CATCH/HOUR: 267.12

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers		SAMP
Genypterus capensis	94.06	42	35.21	7180
Merluccius paradoxus	32.80	38	12.28	7178
Coelorinchus simorynchus	30.00		11.23	
Cruriraja parcomaculata	26.00	20	9.73	
Etmopterus sp.	22.40		8.39	
Notacanthus sexspinis	14.72		5.51	
Merluccius paradoxus	10.00	54	3.74	7177
Parapagurus pilosimanus	5.00		1.87	
Hydrolagus africanus	4.80	4	1.80	
Todarodes angolensis - males	4.06	6	1.52	7182
Raja leopardus	4.04	4	1.51	
Myxine capensis	3.80		1.42	
Funchalia woodwardi	2.60		0.97	
Genypterus capensis	1.94	4	0.73	7179
Todarodes angolensis - females	1.72	2	0.64	7183
Psychrolutes macrocephalus	1.60	16	0.60	
Nezumia sp.	1.40	72	0.52	
Bassanago albescens	1.12	4	0.42	
Lucigadus ori	1.00	78	0.37	
Epigonus sp.	0.70	34	0.26	
Photichthys argenteus	0.60	48	0.22	
Bathynectes sp.	0.50	58	0.19	
Stoloteuthis sp.	0.38		0.14	
Selachophidium guentheri	0.30	10	0.11	
Malacocephalus laevis	0.28	8	0.10	
Lycoteuthis diadema *	0.26	22	0.10	
Helicolenus dactylopterus	0.24	2	0.09	7181
Tripterophycis gilchristi	0.20	14	0.07	
Plesiopenaeus edwardsianus	0.10	2	0.04	
Stereomastis sp.	0.10	14	0.04	
Chaceon chuni	0.10	2	0.04	
Conger wilsoni	0.08	2	0.03	
Coelorinchus braueri	0.06	14	0.02	
Symbolophorus boops	0.06	4	0.02	
Squilla sp.	0.04	2	0.01	
Hoplostethus mediterraneus	0.02	8	0.01	
MYCTOPHIDAE	0.02		0.01	
Gonostoma elongatum	0.02		0.01	
Rossia enigmatica	0.00	2		
Total	267.12		99.97	

PROJECT STATION: 835

DATE:27/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2809
start stop duration Long E 1433
TIME :09:27:22 09:57:15 30 (min) Purpose code:
LOG :1514.33 1515.82 1.48 Area code :
FDEPTH: 381 386 GearCond.code:
BDEPTH: 381 386 Validity code:
Towing dir: 25ø Wire out:1060 m Speed: 30 kn*10

Sorted: Kg Total catch: 451.24 CATCH/HOUR: 902.48

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers		SAMP
Merluccius paradoxus	212.00	1576	23.49	7169
Coelorinchus simorynchus	184.00		20.39	
Genypterus capensis	147.98	84	16.40	7173
Merluccius paradoxus	98.00	124	10.86	7170
Krill	84.00		9.31	
Merluccius capensis	56.00	28	6.21	7168
Lophius vomerinus	32.00	12	3.55	7175
Genypterus capensis	28.02	36	3.10	7172
Scyliorhinus capensis	14.00	18	1.55	
Helicolenus dactylopterus	10.60	32	1.17	7174
Etmopterus sp.	10.00		1.11	
Holohalaelurus regani	7.40	16	0.82	
Bathynectes sp.	5.00		0.55	
Malacocephalus laevis	3.00		0.33	
Photichthys argenteus	2.40		0.27	
Todarodes angolensis - males	2.00	4	0.22	7176
Epigonus sp.	1.60		0.18	
Brama brama	1.20	2	0.13	7171
Nezumia sp.	0.74	44	0.08	
Lucigadus ori	0.58		0.06	
Notacanthus sexspinis	0.36	16	0.04	
Galeus polli	0.36	2	0.04	
Lycoteuthis diadema *	0.32	24	0.04	
Tripterophycis gilchristi	0.28	16	0.03	
Parapagurus pilosimanus	0.12	6	0.01	
Rochinia sp.	0.08	2	0.01	
Physiculus capensis	0.08	10	0.01	
Symbolophorus boops	0.08	6	0.01	
Bathophilus longipinnis	0.08	4	0.01	
Stereomastis sp.	0.04	12		
Hoplostethus mediterraneus	0.04	8		
Cyttus traversi	0.04	2		
Squilla sp.	0.02	4		
Electrona risso	0.02	4		
Lampanyctodes hectoris	0.02	10		
Diaphus effulgens	0.02	4		
Diaphus sp.	0.00	2		
Total	902.48		99.98	

PROJECT STATION: 837

DATE:27/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2825
start stop duration Long E 1426
TIME :14:42:40 15:12:32 30 (min) Purpose code:
LOG :1544.06 1545.53 1.46 Area code :
FDEPTH: 419 419 GearCond.code:
BDEPTH: 419 419 Validity code:
Towing dir: 180ø Wire out:1100 m Speed: 30 kn*10

Sorted: Kg Total catch: 347.35 CATCH/HOUR: 694.70

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers		SAMP
Genypterus capensis	162.00	94	23.32	7187
Merluccius paradoxus	158.00	808	22.74	7185
Coelorinchus simorynchus	152.00		21.88	
Merluccius paradoxus	130.00	174	18.71	7186
Merluccius capensis	18.00	8	2.59	7184
Lucigadus ori	17.00		2.45	
Helicolenus dactylopterus	13.00	42	1.87	7188
Krill	10.00		1.44	
Todarodes angolensis - males	4.70	8	0.68	7189
Bathynectes sp.	4.00		0.58	
Todarodes angolensis - females	3.70	4	0.53	7190
Notacanthus sexspinis	3.40	48	0.49	
Scyliorhinus capensis	3.30	4	0.48	
Tripterophycis gilchristi	2.70		0.39	
Holohalaelurus regani	2.60	8	0.37	
Raja leopardus	2.34	6	0.34	
Stoloteuthis sp.	1.16		0.17	
Photichthys argenteus	1.04	66	0.15	
Cruriraja parcomaculata	1.00	2	0.14	
Galeus polli	0.80	6	0.12	
Rossia enigmatica	0.78		0.11	
Malacocephalus laevis	0.70	14	0.10	
Lycoteuthis diadema *	0.40	36	0.06	
Myxine capensis	0.40	4	0.06	
Etmopterus brachyurus	0.32	34	0.05	
Symbolophorus boops	0.30	22	0.04	
Epigonus sp.	0.28		0.04	
Conger wilsoni	0.24	2	0.03	
Nezumia sp.	0.16	8	0.02	
Rochinia sp.	0.08	4	0.01	
CARIDEA	0.06	16	0.01	
Stereomastis sp.	0.06	12	0.01	
Scopelosaurus meadi	0.06	2	0.01	
Diaphus sp.	0.06	58	0.01	
Hoplostethus mediterraneus	0.02	6		
MYCTOPHIDAE	0.02			
Myctophum sp.	0.02	2		
Nemichthys curvirostris	0.00	24		
Paracallionymus costatus	0.00	2		
Coelorinchus matamua	0.00	2		
Total	694.70		100.00	

PROJECT STATION: 838

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2841
start stop duration Long E 1422
TIME :06:06:27 06:36:11 30 (min) Purpose code:
LOG :1592.71 1594.26 1.54 Area code :
FDEPTH: 451 448 GearCond.code:
BDEPTH: 451 448 Validity code:
Towing dir: 360ø Wire out:1210 m Speed: 30 kn*10

Sorted: Kg Total catch: 234.95 CATCH/HOUR: 469.90

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	218.00	244 46.39	7192
Merluccius paradoxus	136.00	808 28.94	7191
Genypterus capensis	32.00	16 6.81	7193
Coelorinchus simorynchus	25.00		5.32
Todarodes angolensis - females	10.00	10 2.13	7198
Epigonus sp.	8.00		1.70
Krill	7.20		1.53
Bassanago albescens	3.50	14	0.74
Helicolenus dactylopterus	3.20	10 0.68	7194
Lophius vomerinus	3.10	16 0.66	7195
Todarodes angolensis - males	2.70	6 0.57	7197
Raja leopardus	2.64	4	0.56
Malacocephalus laevis	2.40	46	0.51
Bathynectes sp.	2.00		0.43
Lucigadus ori	2.00		0.43
Notacanthus sexspinis	1.60	28	0.34
Rossia enigmatica	1.40		0.30
Photichthys argenteus	1.30	68	0.28
Octopus vulgaris	1.20	2	0.26
Lycoteuthis diadema *	1.00	94	0.21
Psychrolutes macrocephalus	1.00	18	0.21
Beryx splendens	1.00	4	0.21
Coelorinchus braueri	0.90		0.19
Selachophidium guentheri	0.40	16	0.09
Etmopterus brachyurus	0.40	18	0.09
Symbolophorus boops	0.38	28	0.08
Todaropsis eblanae	0.28	2 0.06	7196
Parapagurus pilosimanus	0.20	18	0.04
Tripterophycis gilchristi	0.20	20	0.04
Nezumia sp.	0.18	10	0.04
Stoloteuthis sp.	0.14		0.03
MYCTOPHIDAE	0.14		0.03
Myxine capensis	0.14	2	0.03
Stereomastis sp.	0.10	28	0.02
Physiculus capensis	0.10	6	0.02
Rochinia sp.	0.08	10	0.02
Mursia cristimanus	0.02	6	
Hoplostethus mediterraneus	0.00	6	
Total	469.90		99.99

PROJECT STATION: 839

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2833
start stop duration Long E 1425
TIME :08:02:44 08:32:50 30 (min) Purpose code:
LOG :1602.00 1603.53 1.51 Area code :
FDEPTH: 375 384 GearCond.code:
BDEPTH: 375 384 Validity code:
Towing dir: 10ø Wire out:1050 m Speed: kn*10

Sorted: Kg Total catch: 417.44 CATCH/HOUR: 834.88

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Coelorinchus simorynchus	274.00		32.82
Helicolenus dactylopterus	170.00	626 20.36	7202
Merluccius paradoxus	120.00	770 14.37	7199
Genypterus capensis	84.00	50 10.06	7201
Merluccius paradoxus	50.00	76 5.99	7200
Scyliorhinus capensis	40.00	46	4.79
Epigonus sp.	22.00		2.64
Octopus dofleini=magnifica	10.60	6	1.27
Holohalaelurus regani	10.00	26	1.20
Raja wallacei	8.00	2	0.96
Galeus polli	7.70	52	0.92
Lucigadus ori	7.00		0.84
Lophius vomerinus	5.98	2 0.72	7204
Rossia enigmatica	3.20		0.38
Bassanago albescens	2.90	4	0.35
Bathynectes sp.	2.80		0.34
Squalus megalops	2.40	2	0.29
Todarodes angolensis - males	2.26	4 0.27	7207
Tripterophycis gilchristi	2.20		0.26
Todarodes angolensis - females	2.16	2 0.26	7208
Lycoteuthis diadema *	2.00	158	0.24
Todaropsis eblanae	0.84	4 0.10	7206
Funchalia woodwardi	0.80		0.10
Parapagurus pilosimanus	0.80		0.10
Beryx splendens	0.80	4	0.10
Malacocephalus laevis	0.50	16	0.06
Paracallionymus costatus	0.42	72	0.05
Photichthys argenteus	0.28	18	0.03
Rochinia sp.	0.20	54	0.02
Sepia hieronis	0.20	4	0.02
Todaropsis eblanae	0.20	2 0.02	7205
Stereomastis sp.	0.14		0.02
Lophius vomerinus	0.10	8 0.01	7203
Hoplostethus mediterraneus	0.08	20	0.01
Symbolophorus boops	0.08	6	0.01
MYCTOPHIDAE	0.08		0.01
Lestidiops sp.	0.04	2	
Diaphus effulgens	0.04	4	
Sepia sp. New SA	0.02	8	
Argentina euchus	0.02	2	
Raja leopardus	0.02	2	
Etmopterus sp.	0.02	4	
Stoloteuthis sp.	0.00	6	
Total	834.88		99.99

PROJECT STATION: 840

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2827
start stop duration Long E 1436
TIME :10:16:56 10:44:24 27 (min) Purpose code:
LOG :1614.82 1616.24 1.40 Area code :
FDEPTH: 170 171 GearCond.code:
BDEPTH: 170 171 Validity code:
Towing dir: 70ø Wire out: 500 m Speed: 30 kn*10

Sorted: Kg Total catch: 1128.03 CATCH/HOUR: 2506.73

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Etrumeus whiteheadi	1026.67		40.96
Merluccius capensis	433.33	364 17.29	7209
Emmelichthys nitidus	268.89		10.73
Lepidopus caudatus	251.11		10.02
Chelidonichthys capensis	97.78	193 3.90	7217
Zeus capensis	86.67	473 3.46	7210
Thyrsites atun	74.76	76 2.98	7213
Squalus megalops	70.00		2.79
Trachurus trachurus	48.89	293 1.95	7211
Thyrsites atun	43.02	20 1.72	7214
Callorhinchus capensis	31.11	20	1.24
Holohalaelurus regani	20.22		0.81
Polyprion americanus	13.33	4	0.53
Chelidonichthys queketti	12.78	80 0.51	7218
Scyliorhinus capensis	8.40		0.34
Congiopodus spinifer	5.13	13	0.20
Todaropsis eblanae	4.91	84 0.20	7219
Scomber japonicus	4.44	2 0.18	7212
Genypterus capensis	1.96	11 0.08	7215
Sepia australis	1.73		0.07
Helicolenus dactylopterus	1.60	109 0.06	7216
Total	2506.73		100.02

PROJECT STATION: 841

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2820
start stop duration Long E 1437
TIME :12:12:47 12:42:44 30 (min) Purpose code:
LOG :1625.45 1627.00 1.54 Area code :
FDEPTH: 177 173 GearCond.code:
BDEPTH: 177 173 Validity code:
Towing dir: 170ø Wire out: 500 m Speed: 30 kn*10

Sorted: Kg Total catch: 466.03 CATCH/HOUR: 932.06

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Squalus megalops	340.00		36.48
Etrumeus whiteheadi	280.00		30.04
Chelidonichthys capensis	94.00	160 10.09	7227
Merluccius capensis	60.00	82 6.44	7220
Chelidonichthys queketti	36.00	222 3.86	7228
Emmelichthys nitidus	32.00		3.43
Trachurus trachurus	28.00	196 3.00	7223
Zeus capensis	17.00	170 1.82	7221
Holohalaelurus regani	9.00	30	0.97
Thyrsites atun	8.00	8 0.86	7224
Congiopodus spinifer	7.00	32	0.75
Sepia australis	4.00		0.43
Lophius vomerinus	4.00	2 0.43	7229
Lepidopus caudatus	3.00	4	0.32
Callorhinchus capensis	3.00	2	0.32
Genypterus capensis	2.80	6 0.30	7225
Todaropsis eblanae	1.62	30 0.17	7230
Todaropsis eblanae	1.54	20 0.17	7231
Cynoglossus zanzibarensis	0.70	4 0.08	7222
Helicolenus dactylopterus	0.26	34 0.03	7226
Sepia hieronis	0.12		0.01
Paracallionymus costatus	0.02	4	
Rochinia sp.	0.00		
Arnoglossus capensis	0.00		
Total	932.06		100.00

PROJECT STATION: 842

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2817
start stop duration Long E 1443
TIME :14:01:00 14:31:15 30 (min) Purpose code:
LOG :1635.20 1636.78 1.57 Area code :
FDEPTH: 208 211 GearCond.code:
BDEPTH: 208 211 Validity code:
Towing dir: 350ø Wire out: 580 m Speed: 30 kn*10

Sorted: Kg Total catch: 450.68 CATCH/HOUR: 901.36

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	220.00	4304 24.41	7234
Trachurus trachurus	184.00	1146 20.41	7239
Merluccius capensis	140.00	146 15.53	7233
Thyrsites atun	56.00	38 6.21	7240
Sepia australis	50.00		5.55
Callorhinchus capensis	32.00	18	3.55
Squalus megalops	28.00	74	3.11
Holohalaelurus regani	26.00		2.88
Chelidonichthys queketti	25.00	124 2.77	7244
Etrumeus whiteheadi	19.00		2.11
Merluccius paradoxus, juvenile	18.18	3202 2.02	7236
Lophius vomerinus	15.00	20 1.66	7245
Chelidonichthys capensis	12.00	24 1.33	7243
Merluccius capensis	12.00	48 1.33	7232
Coelorinchus simorynchus	10.00		1.11
Merluccius paradoxus	8.80	20 0.98	7235
Zeus capensis	7.30	122 0.81	7237
Todaropsis eblanae	4.72	60 0.52	7248
Helicolenus dactylopterus	4.60	494 0.51	7242
Mustelus palumbes	4.50	4	0.50
Paracallionymus costatus	4.00		0.44
Cynoglossus zanzibarensis	4.00	40 0.44	7238
Raja straeleni	2.60	4	0.29
Congiopodus torvus	2.00	2	0.22
Lepidopus caudatus	2.00		0.22
Genypterus capensis	1.80	12 0.20	7241
Todarodes angolensis - females	1.50	2 0.17	7250
Todarodes angolensis - males	1.40	2 0.16	7249
Maurolicus muelleri	1.00		0.11
Todaropsis eblanae	0.96	18 0.11	7247
Sepia hieronis	0.82	20	0.09
Todaropsis eblanae	0.80	48 0.09	7246
Congiopodus spinifer	0.80	6	0.09
Bathynectes sp.	0.28		0.03
Lolligoncula mercatoris	0.10		0.01
Exodromidia sp.	0.04	4	
Mursia cristimanus	0.02	2	
Parapagurus dimorphus	0.02	4	
Champsodon capensis	0.02	2	
Arnoglossus capensis	0.02	4	
Physiculus capensis	0.02	2	
Chlorophthalmus agassizi	0.02	2	
Symbolophorus boops	0.02	2	
MYCTOPHIDAE	0.02		
Rochinia sp.	0.00	2	
Total	901.36		99.97

PROJECT STATION: 843

DATE:28/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2814
start stop duration Long E 1455
TIME :15:52:38 16:22:13 30 (min) Purpose code:
LOG :1648.36 1649.99 1.61 Area code :
FDEPTH: 191 189 GearCond.code:
BDEPTH: 191 189 Validity code:
Towing dir: 30ø Wire out: 540 m Speed: 31 kn*10

Sorted: Kg Total catch: 722.10 CATCH/HOUR: 1444.20

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	422.00	4456 29.22	7251
Etrumeus whiteheadi	276.80	19.17	
Merluccius paradoxus	268.00	7896 18.56	7253
Sepia australis	102.48	7.10	
Merluccius capensis	89.00	120 6.16	7252
Merluccius paradoxus, juvenile	82.40	6426 5.71	7254
Chelidonichthys capensis	56.00	154 3.88	7261
Lophius vomerinus	34.00	42 2.35	7263
Thyrsites atun	18.00	10 1.25	7258
Holohalaelurus regani	15.14	38 1.05	
Raja straeleni	10.70	6 0.74	
Lepidopus caudatus	10.34	0.72	
Trachurus trachurus	10.22	76 0.71	7257
Callorhinchus capensis	10.00	4 0.69	
Paracallionymus costatus	8.04	0.56	
Todaropsis eblanae	7.12	210 0.49	7264
Zeus capensis	4.76	190 0.33	7255
Congiopodus spinifer	4.62	20 0.32	
Genypterus capensis	4.60	18 0.32	7259
Coelorinchus simorynchus	3.20	58 0.22	
Cynoglossus zanzibarensis	2.92	134 0.20	7256
Macropipus sp.	1.38	38 0.10	
Chelidonichthys queketti	1.20	8 0.08	7262
Helicolenus dactylopterus	0.62	114 0.04	7260
Squilla sp.	0.48	38 0.03	
Lolligoncula mercatoris	0.18	76 0.01	
Total	1444.20	100.01	

PROJECT STATION: 844

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2746
start stop duration Long E 1520
TIME :05:27:03 05:57:11 30 (min) Purpose code:
LOG :1760.07 1761.59 1.51 Area code :
FDEPTH: 132 131 GearCond.code:
BDEPTH: 132 131 Validity code:
Towing dir: 156ø Wire out: 390 m Speed: 30 kn*10

Sorted: Kg Total catch: 193.82 CATCH/HOUR: 387.64

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	148.00	2306 38.18	7265
Chelidonichthys capensis	102.00	408 26.31	7272
Thyrsites atun	65.02	16 16.77	7270
Etrumeus whiteheadi	22.00	5.68	
Callorhinchus capensis	18.00	12 4.64	
Sepia australis	12.00	3.10	
Merluccius capensis	5.40	12 1.39	7266
Raja straeleni	3.40	2 0.88	
Austroglossus microlepis	2.40	8 0.62	7267
Genypterus capensis	2.00	38 0.52	7271
Thyrsites atun	1.98	10 0.51	7269
Macropipus sp.	1.66	0.43	
Lolligoncula mercatoris	1.24	0.32	
Todaropsis eblanae	0.70	20 0.18	7273
Trachurus trachurus	0.70	4 0.18	7268
Todaropsis eblanae	0.50	16 0.13	7274
Squilla sp.	0.24	52 0.06	
Sufflogobius bibarbatus	0.14	26 0.04	
Exodromidia sp.	0.12	8 0.03	
Lepidopus caudatus	0.10	2 0.03	
Paracallionymus costatus	0.04	8 0.01	
Total	387.64	100.01	

PROJECT STATION: 845

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2753
start stop duration Long E 1506
TIME :07:50:31 08:20:14 30 (min) Purpose code:
LOG :1776.88 1778.40 1.51 Area code :
FDEPTH: 167 168 GearCond.code:
BDEPTH: 167 168 Validity code:
Towing dir: 192ø Wire out: 500 m Speed: 30 kn*10

Sorted: Kg Total catch: 514.53 CATCH/HOUR: 1029.06

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	520.80	5874 50.61	7275
Chelidonichthys capensis	170.00	466 16.52	7288
Merluccius capensis	132.44	250 12.87	7276
Etrumeus whiteheadi	26.00	2.53	
Callorhinchus capensis	20.00	16 1.94	
Sepia australis	18.00	1.75	
Thyrsites atun	15.34	4 1.49	7285
Macropipus sp.	14.40	1.40	
Galeorhinus galeus	13.20	2 1.28	
Merluccius paradoxus, juvenile	12.40	764 1.20	7278
Brama brama	10.00	4 0.97	7283
Zeus capensis	8.40	248 0.82	7279
Squalus megalops	8.00	18 0.78	
Thyrsites atun	7.66	6 0.74	7284
Merluccius capensis	7.56	2 0.73	7277
Sufflogobius bibarbatus	6.00	0.58	
Lepidopus caudatus	6.00	0.58	
Genypterus capensis	5.80	50 0.56	7286
Trachurus trachurus	4.00	24 0.39	7282
Mustelus palumbes	4.00	4 0.39	
Torpedo nobiliana	3.50	4 0.34	
Raja straeleni	3.30	4 0.32	
Congiopodus spinifer	2.00	0.19	
Cynoglossus zanzibarensis	2.00	16 0.19	7281
Austroglossus microlepis	2.00	6 0.19	7280
Todaropsis eblanae	1.72	34 0.17	7291
Todaropsis eblanae	1.66	40 0.16	7292
Lophius vomerinus	0.94	4 0.09	7290
Chelidonichthys queketti	0.70	6 0.07	7289
Helicolenus dactylopterus	0.34	90 0.03	7287
Exodromidia sp.	0.24	10 0.02	
Sepia hieronis	0.18	0.02	
Coelorinchus simorynchus	0.16	2 0.02	
Squilla sp.	0.12	24 0.01	
Paracallionymus costatus	0.08	16 0.01	
Octopus vulgaris	0.06	0.01	
Lolligoncula mercatoris	0.06	0.01	
Goneplax angulata	0.00	2	
Total	1029.06	99.98	

PROJECT STATION: 846

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2800
start stop duration Long E 1503
TIME :09:40:47 10:10:29 30 (min) Purpose code:
LOG :1786.53 1788.02 1.49 Area code :
FDEPTH: 184 184 GearCond.code:
BDEPTH: 184 184 Validity code:
Towing dir: 20ø Wire out: 540 m Speed: 30 kn*10

Sorted: Kg Total catch: 546.67 CATCH/HOUR: 1093.34

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	672.00	7224 61.46	7293
Merluccius capensis	92.00	142 8.41	7294
Lepidopus caudatus	70.00	6.40	
Merluccius paradoxus, juvenile	61.04	4168 5.58	7295
Etrumeus whiteheadi	34.00	3.11	
Zeus capensis	28.96	984 2.65	7296
Sepia australis	24.10	2.20	
Chelidonichthys capensis	23.00	64 2.10	7302
Squalus megalops	16.80	46 1.54	
Callorhinchus capensis	14.00	8 1.28	
Chelidonichthys queketti	9.32	50 0.85	7303
Todaropsis eblanae	8.72	0.80	
Lophius vomerinus	8.60	6 0.79	7304
Thyrsites atun	8.00	2 0.73	7299
Trachurus trachurus	5.32	10 0.49	7298
Macropipus sp.	5.10	0.47	
Holohalaelurus regani	3.60	24 0.33	
Cynoglossus zanzibarensis	2.32	10 0.21	7297
Raja straeleni	2.00	2 0.18	
Todaropsis eblanae	1.00	22 0.09	7306
Todaropsis eblanae	0.82	12 0.07	7305
Genypterus capensis	0.80	6 0.07	7300
Coelorinchus simorynchus	0.68	12 0.06	
Sufflogobius bibarbatus	0.58	104 0.05	
Paracallionymus costatus	0.36	70 0.03	
Squilla sp.	0.12	0.01	
Helicolenus dactylopterus	0.10	34 0.01	7301
Total	1093.34	99.97	

PROJECT STATION: 847

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2757
start stop duration Long E 1455
TIME :11:34:06 12:04:22 30 (min) Purpose code:
LOG :1797.52 1799.10 1.56 Area code :
FDEPTH: 196 195 GearCond.code:
BDEPTH: 196 195 Validity code:
Towing dir: 100ø Wire out: 560 m Speed: 31 kn*10

Sorted: Kg Total catch: 564.76 CATCH/HOUR: 1129.52

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius capensis	270.00	418 23.90	7308
Merluccius paradoxus, juvenile	228.40	14748 20.22	7311
Merluccius capensis	192.00	1620 17.00	7307
Merluccius paradoxus	84.00	902 7.44	7310
Callorhinchus capensis	76.00	38 6.73	
Merluccius paradoxus	50.20	1966 4.44	7309
Chelidonichthys capensis	36.00	76 3.19	7318
Squalus megalops	34.00	78 3.01	
Trachurus trachurus	30.00	92 2.66	7315
Zeus capensis	27.00	306 2.39	7312
Chelidonichthys queketti	26.00	124 2.30	7319
Macropipus sp.	14.80	1.31	
Lophius vomerinus	12.00	6 1.06	7320
Austroglossus microlepis	11.20	28 0.99	7313
Holohalaelurus regani	8.00	0.71	
Emmelichthys nitidus	7.40	0.66	
Genypterus capensis	6.00	18 0.53	7316
Sepia australis	3.60	0.32	
Todaropsis eblanae	2.52	0.22	
Coelorinchus simorynchus	2.06	26 0.18	
Cynoglossus zanzibarensis	1.92	10 0.17	7314
Todaropsis eblanae	1.70	28 0.15	7322
Lepidopus caudatus	1.52	22 0.13	
Todaropsis eblanae	1.28	24 0.11	7321
Etrumeus whiteheadi	0.88	12 0.08	
Sufflogobius bibarbatus	0.44	70 0.04	
Sepia hieronis	0.30	8 0.03	
Helicolenus dactylopterus	0.30	48 0.03	7317
Total	1129.52	100.00	

PROJECT STATION: 848

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2804
start stop duration Long E 1447
TIME :13:53:48 14:23:35 30 (min) Purpose code:
LOG :1812.97 1814.56 1.59 Area code :
FDEPTH: 201 199 GearCond.code:
BDEPTH: 201 199 Validity code:
Towing dir: 60ø Wire out: 580 m Speed: 31 kn*10

Sorted: Kg Total catch: 446.93 CATCH/HOUR: 893.86

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	348.00	6960 38.93	7326
Merluccius capensis	244.00	332 27.30	7324
Callorhinchus capensis	72.00	32 8.05	
Chelidonichthys queketti	50.00	208 5.59	7336
Merluccius paradoxus, juvenile	38.40	2182 4.30	7327
Merluccius paradoxus	32.54	238 3.64	7325
Merluccius capensis	22.60	174 2.53	7323
Holohalaelurus regani	14.00	48 1.57	
Zeus capensis	8.40	162 0.94	7328
Trachurus trachurus	8.00	32 0.89	7331
Chelidonichthys capensis	7.60	14 0.85	7335
Squalus megalops	7.60	16 0.85	
Etrumeus whiteheadi	6.50	0.73	
Thyrsites atun	5.40	2 0.60	7332
Macropipus sp.	3.56	0.40	
Raja straeleni	3.00	2 0.34	
Cynoglossus zanzibarensis	2.94	24 0.33	7330
Todaropsis eblanae	2.38	0.27	
Lophius vomerinus	2.30	2 0.26	7337
Coelorinchus simorynchus	2.06	16 0.23	
Todarodes angolensis - females	1.78	2 0.20	7340
Genypterus capensis	1.76	8 0.20	7333
Emmelichthys nitidus	1.68	68 0.19	
Austroglossus microlepis	1.50	2 0.17	7329
Sepia australis	1.46	0.16	
Todaropsis eblanae	1.20	22 0.13	7339
Todaropsis eblanae	0.96	12 0.11	7338
Paracallionymus costatus	0.68	0.08	
Lepidopus caudatus	0.58	4 0.06	
Helicolenus dactylopterus	0.38	46 0.04	7334
Sepia hieronis	0.22	4 0.02	
Chlorophthalmus agassizi	0.22	26 0.02	
Exodromidia sp.	0.10	8 0.01	
Champsodon capensis	0.06	4 0.01	
Total	893.86	100.00	

PROJECT STATION: 849

DATE:29/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2801
start stop duration Long E 1439
TIME :15:53:05 16:20:05 27 (min) Purpose code:
LOG :1826.20 1827.58 1.36 Area code :
FDEPTH: 357 354 GearCond.code:
BDEPTH: 357 354 Validity code:
Towing dir: 220ø Wire out: 950 m Speed: 31 kn*10
Sorted: Kg Total catch: 373.32 CATCH/HOUR: 829.59

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	284.44	587 34.29	7343
Coelorinchus simorynchus	180.00		21.70
Merluccius paradoxus	131.11	833 15.80	7342
Genypterus capensis	115.00	71 13.86	7346
Genypterus capensis	61.67	71 7.43	7345
Scyliorhinus capensis	14.44	22	1.74
Bathynectes sp.	8.89		1.07
Malacocephalus laevis	8.89		1.07
Merluccius capensis	8.33	7 1.00	7341
Todaropsis eblanae	4.00	31 0.48	7349
Holohalaelurus regani	2.11	7	0.25
Todaropsis eblanae	1.93	16 0.23	7348
Lucigadus ori	1.80		0.22
Galeus polli	1.78	18	0.21
Helicolenus dactylopterus	1.42	11 0.17	7347
Epigonus sp.	1.24		0.15
Tripterophycis gilchristi	1.11		0.13
Squalus megalops	0.67	2	0.08
Symbolophorus boops	0.56		0.07
Cynoglossus zanzibarensis	0.09	2 0.01	7344
Parapagurus pilosimanus	0.07	4	0.01
Squilla sp.	0.04	7	
Paracallionymus costatus	0.00		
Total	829.59		99.97

PROJECT STATION: 850

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2803
start stop duration Long E 1436
TIME :05:33:07 06:03:26 30 (min) Purpose code:
LOG :1936.09 1937.60 1.51 Area code :
FDEPTH: 461 456 GearCond.code:
BDEPTH: 461 456 Validity code:
Towing dir: 40ø Wire out:1200 m Speed: 30 kn*10
Sorted: Kg Total catch: 106.30 CATCH/HOUR: 212.60

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Coelorinchus simorynchus	86.00		40.45
Genypterus capensis	60.00	30 28.22	7352
Merluccius paradoxus	22.00	18 10.35	7351
Lophius vomerinus	8.60	6 4.05	7353
Etmopterus sp.	6.00	244	2.82
Stereomastis sp.	5.70		2.68
Merluccius paradoxus	4.80	28 2.26	7350
Todarodes angolensis - females	4.40	6 2.07	7355
Funchalia woodwardi	3.20		1.51
Myxine capensis	2.70		1.27
Malacocephalus laevis	1.80	34	0.85
Notacanthus sexspinis	1.60	112	0.75
Bathynectes sp.	1.50	102	0.71
Epigonus sp.	1.20	116	0.56
Todarodes angolensis - males	1.10	2 0.52	7354
Lucigadus ori	0.64	66	0.30
Parapagurus pilosimanus	0.50	24	0.24
Tripterophycis gilchristi	0.26	34	0.12
Psychrolutes macrocephalus	0.20	14	0.09
Photichthys argenteus	0.12	14	0.06
Lycoteuthis diadema *	0.10	14	0.05
Symbolophorus boops	0.06	6	0.03
Stoloteuthis sp.	0.04	12	0.02
Squilla sp.	0.02	4	0.01
Mursia cristimanus	0.02	2	0.01
Physiculus capensis	0.02	2	0.01
Diaphus sp.	0.02	4	0.01
Bassanago albescens	0.00	2	
MYCTOPHIDAE	0.00	4	
Total	212.60		100.02

PROJECT STATION: 851

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2749
start stop duration Long E 1434
TIME :08:15:00 08:45:23 30 (min) Purpose code:
LOG :1950.84 1952.39 1.54 Area code :
FDEPTH: 558 555 GearCond.code:
BDEPTH: 558 555 Validity code:
Towing dir: 330ø Wire out:1500 m Speed: 30 kn*10
Sorted: Kg Total catch: 238.07 CATCH/HOUR: 476.14

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Coelorinchus braueri	144.00		30.24
Nezumia sp.	115.66		24.29
Merluccius paradoxus	78.00	48 16.38	7357
Funchalia woodwardi	14.10	2144	2.96
Lophius vomerinus	14.00	2 2.94	7358
Todarodes angolensis - females	13.80	16 2.90	7360
Hydrolagus africanus	12.00	12	2.52
Krill	10.00		2.10
Bathyraja smithii	10.00	2	2.10
Gymnoscopelus sp.	9.10		1.91
Todarodes angolensis - males	8.90	18 1.87	7359
Selachophidium guentheri	8.20	110	1.72
Photichthys argenteus	7.30		1.53
Etmopterus sp.	6.00		1.26
Raja leopardus	5.00		1.05
Notacanthus sexspinis	4.40	140	0.92
Stereomastis sp.	3.40		0.71
Etmopterus brachyurus	3.20	10	0.67
Bathophilus longipinnis	2.00	46	0.42
Raja confundens	1.80	4	0.38
Lithodes sp.	0.80	6	0.17
Trachyscorpia capensis	0.72	6	0.15
Coelorinchus matamua	0.64	6	0.13
Malacocephalus laevis	0.44	8	0.09
Scopelosaurus meadi	0.38	52	0.08
Merluccius paradoxus	0.36	2 0.08	7356
Bathynectes sp.	0.32	30	0.07
Stoloteuthis sp.	0.24		0.05
Epigonus sp.	0.22	4	0.05
Lycoteuthis diadema *	0.20	20	0.04
Bassanago albescens	0.20	4	0.04
MYCTOPHIDAE	0.16		0.03
Lucigadus ori	0.12	12	0.03
Tripterophycis gilchristi	0.08	4	0.02
Aristaeomorpha foliacea	0.06	2	0.01
Parapagurus pilosimanus	0.06	2	0.01
Bathypolypus valdiviae	0.06	2	0.01
Nemichthys curvirostris	0.04	4	0.01
Howella sherboni	0.04	2	0.01
Electrona risso	0.04	8	0.01
Symbolophorus boops	0.04	4	0.01
Xenodermichthys copei	0.04		0.01
Lestidiops sp.	0.02	2	
Total	476.14		99.98

PROJECT STATION: 852

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2747
start stop duration Long E 1437
TIME :10:10:08 10:40:13 30 (min) Purpose code:
LOG :1958.46 1960.01 1.55 Area code :
FDEPTH: 445 460 GearCond.code:
BDEPTH: 445 460 Validity code:
Towing dir: 160ø Wire out:1200 m Speed: 30 kn*10

Sorted: Kg Total catch: 324.21 CATCH/HOUR: 648.42

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	294.00	512 45.34	7362
Merluccius paradoxus	112.00	514 17.27	7361
Coelorinchus simorynchus	62.00		9.56
CARIDEA	56.00		8.64
Genypterus capensis	52.00	26 8.02	7363
Coelorinchus braueri	18.00		2.78
Todarodes angolensis - males	10.00	22 1.54	7366
Todarodes angolensis - females	6.60	8 1.02	7367
Raja leopardus	5.40	10	0.83
Lophius vomerinus	5.20	2 0.80	7365
Lucigadus ori	4.00		0.62
Photichthys argenteus	3.70		0.57
Parapagurus pilosimanus	3.20		0.49
Nezumia sp.	2.00		0.31
Malacocephalus laevis	2.00		0.31
Galeus polli	1.80	14	0.28
Selachophidium guentheri	1.64		0.25
Bassanago albescens	1.40	6	0.22
Psychrolutes macrocephalus	1.20	28	0.19
Helicolenus dactylopterus	1.20	10 0.19	7364
Paracallionymus costatus	0.88	50	0.14
Bathophilus longipinnis	0.78	20	0.12
Notacanthus sexspinis	0.60	20	0.09
Lycoteuthis diadema *	0.56	52	0.09
Bathynectes sp.	0.40	50	0.06
Coelorinchus matamua	0.28	8	0.04
Etmopterus sp.	0.28	12	0.04
Myxine capensis	0.24	2	0.04
Stereomastis sp.	0.20		0.03
Epigonus sp.	0.20	4	0.03
Tripterophycis gilchristi	0.10	4	0.02
Rochinia sp.	0.08	6	0.01
Stoloteuthis sp.	0.08		0.01
Rossia enigmatica	0.06		0.01
Lestidiops sp.	0.06	4	0.01
Gymnoscopelus sp.	0.06	8	0.01
Electrona risso	0.06	16	0.01
Symbolophorus boops	0.06	6	0.01
Diaphus sp.	0.04	18	0.01
Sepia sp. New SA	0.02	2	
Scopelosaurus herwigi	0.02	2	
Diaphus effulgens	0.02	2	
Abraliopsis gilchristi	0.00	2	
Argentina euchus	0.00	2	
Total	648.42		100.01

PROJECT STATION: 853

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2742
start stop duration Long E 1449
TIME :12:30:07 12:51:12 21 (min) Purpose code:
LOG :1973.08 1974.21 1.12 Area code :
FDEPTH: 357 353 GearCond.code:
BDEPTH: 357 353 Validity code:
Towing dir: 345ø Wire out: 950 m Speed: 31 kn*10

Sorted: Kg Total catch: 406.01 CATCH/HOUR: 1160.04

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Merluccius paradoxus	674.29	5997 58.13	7368
Trachurus trachurus	280.00	743 24.14	7370
Merluccius paradoxus	65.71	117 5.66	7369
Coelorinchus simorynchus	34.29		2.96
Genypterus capensis	24.29	29 2.09	7373
Squilla sp.	20.00		1.72
Bathynectes sp.	14.29		1.23
Thyrsites atun	13.14	9 1.13	7372
Lophius vomerinus	11.43	6 0.99	7375
Brama brama	5.71	6 0.49	7371
Todaropsis eblanae	4.00	37 0.34	7377
Todarodes angolensis - females	3.86	6 0.33	7378
Lepidopus caudatus	2.57	3	0.22
Todaropsis eblanae	2.26	31 0.19	7376
Malacocephalus laevis	1.43		0.12
Galeus polli	1.11		0.10
Helicolenus dactylopterus	0.40	3 0.03	7374
Ophichthus bennettai	0.31		0.03
Etmopterus sp.	0.23		0.02
Selachophidium guentheri	0.20		0.02
Lucigadus ori	0.14		0.01
Coelorinchus braueri	0.14		0.01
Nezumia sp.	0.09		0.01
Stereomastis sp.	0.03		
Mursia cristimanus	0.03		
Physiculus capensis	0.03		
Chlorophthalmus agassizi	0.03		
Maurolicus muelleri	0.03		
Rochinia sp.	0.00		
Total	1160.04		99.97

PROJECT STATION: 854

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2738
start stop duration Long E 1458
TIME :14:20:49 14:41:57 21 (min) Purpose code:
LOG :1984.04 1985.15 1.11 Area code :
FDEPTH: 234 235 GearCond.code:
BDEPTH: 234 235 Validity code:
Towing dir: 20ø Wire out: 650 m Speed: 31 kn*10

Sorted: Kg Total catch: 381.65 CATCH/HOUR: 1090.43

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	542.86	5057	49.78	7379
Trachurus trachurus	134.29	840	12.32	7385
Merluccius paradoxus	91.43	2657	8.38	7381
Thyrsites atun	61.71	43	5.66	7386
Merluccius capensis	51.43	100	4.72	7380
Callorhinchus capensis	48.57	29	4.45	
Chelidonichthys capensis	40.00	57	3.67	7389
Genypterus capensis	37.14	106	3.41	7387
Coelorinchus simorynchus	14.29		1.31	
Etrumeus whiteheadi	11.43		1.05	
Sepia australis	10.71		0.98	
Lophius vomerinus	9.20	23	0.84	7390
Bathynectes sp.	8.57		0.79	
Sufflogobius bibarbatus	5.71		0.52	
Raja straeleni	4.00	20	0.37	
Squalus megalops	4.00	9	0.37	
Austroglossus microlepis	2.86	6	0.26	7384
Todaropsis eblanae	2.77	40	0.25	7392
Lepidopus caudatus	2.69	23	0.25	
Todaropsis eblanae	1.49	26	0.14	7391
Todarodes angolensis - males	1.40		0.13	7393
Squilla sp.	1.06	174	0.10	
Merluccius paradoxus	0.91	3	0.08	7382
Zeus capensis	0.86	6	0.08	7383
Beryx splendens	0.29	3	0.03	
Maurolicus muelleri	0.29		0.03	
Macropipus sp.	0.11	6	0.01	
Helicolenus dactylopterus	0.09	26	0.01	7388
Emmelichthys nitidus	0.09	3	0.01	
Chlorophthalmus agassizi	0.06	6	0.01	
Exodromidia sp.	0.03	3		
Sepia hieronis	0.03	3		
Lolligoncula mercatoris	0.03	11		
Paracallionymus costatus	0.03	3		
Inioteuthis capensis	0.00	3		
Total	1090.43		100.01	

PROJECT STATION: 855

DATE:30/ 4/04 GEAR TYPE: BT No:15 POSITION:Lat S 2733
start stop duration Long E 1503
TIME :15:41:11 16:11:13 30 (min) Purpose code:
LOG :1991.39 1993.04 1.64 Area code :
FDEPTH: 186 187 GearCond.code:
BDEPTH: 186 187 Validity code:
Towing dir: 20ø Wire out: 550 m Speed: 31 kn*10

Sorted: Kg Total catch: 497.98 CATCH/HOUR: 995.96

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	412.00	5142	41.37	7394
Chelidonichthys capensis	148.00	328	14.86	7403
Sepia australis	90.00		9.04	
Trachurus trachurus	84.00	582	8.43	7399
Thyrsites atun	62.00	42	6.23	7400
Merluccius paradoxus, juvenile	56.40	3444	5.66	7396
Merluccius capensis	40.00	76	4.02	7395
Callorhinchus capensis	34.00		3.41	
Genypterus capensis	21.80	212	2.19	7401
Austroglossus microlepis	11.90	52	1.19	7398
Mustelus palumbes	6.00	2	0.60	
Macropipus sp.	5.40		0.54	
Lophius vomerinus	5.00	22	0.50	7404
Etrumeus whiteheadi	3.90		0.39	
Squalus megalops	3.70	6	0.37	
Todaropsis eblanae	3.20		0.32	
Raja straeleni	2.00		0.20	
Sufflogobius bibarbatus	1.50		0.15	
Torpedo nobiliana	1.50		0.15	
Todaropsis eblanae	0.96	14	0.10	7405
Squilla sp.	0.76	32	0.08	
Exodromidia sp.	0.70	36	0.07	
Todaropsis eblanae	0.64	12	0.06	7406
Zeus capensis	0.32	6	0.03	7397
Maurolicus muelleri	0.16		0.02	
Helicolenus dactylopterus	0.10	28	0.01	7402
Lolligoncula mercatoris	0.02	6		
Total	995.96		99.99	

Annex II Hake catches in kg per hour by trawl station

Station	Lat.	Long.	Depth	Juvenile deepw. Hake	Deepwater Hake	Juvenile Cape hake	Cape hake
806	-27,37	15,23	116	0,0	0,0	0,0	38,4
807	-27,40	15,08	165	0,0	0,0	0,0	375,5
808	-27,48	14,97	243	0,0	402,0	0,0	62,0
809	-27,55	14,80	325	0,0	448,0	0,0	0,0
810	-27,57	14,70	343	0,0	411,0	0,0	30,0
811	-27,67	14,55	446	0,0	98,2	0,0	0,0
812	-28,37	14,82	196	0,0	310,0	0,0	192,0
813	-28,32	14,95	182	74,6	70,4	0,0	417,4
814	-28,27	15,10	180	0,0	124,8	0,0	480,0
815	-28,05	15,58	92	0,0	0,0	0,0	23,2
816	-28,80	16,33	84	0,0	0,0	18,0	2505,0
817	-28,92	16,08	150	804,0	0,0	0,0	90,6
818	-29,00	15,85	176	0,0	44,5	0,0	64,5
819	-29,05	15,70	180	168,8	21,9	0,0	110,6
820	-29,17	15,47	186	120,0	52,4	0,0	134,5
821	-29,30	15,07	177	20,0	11,0	0,0	164,0
822	-29,37	14,92	198	0,7	8,3	0,0	77,4
823	-29,37	14,63	326	0,0	494,0	0,0	102,0
824	-29,48	14,58	431	0,0	1440,0	0,0	6,0
825	-29,52	14,53	523	0,0	162,0	0,0	0,0
826	-29,37	14,53	442	0,0	159,2	0,0	8,8
827	-29,22	14,48	447	0,3	518,7	0,0	0,0
828	-29,03	14,40	485	0,0	1206,0	0,0	0,0
829	-29,02	14,47	334	0,0	434,4	0,0	180,0
830	-28,90	14,40	435	0,0	608,0	0,0	0,0
831	-28,57	14,33	567	0,0	36,8	0,0	0,0
832	-28,53	14,40	446	0,0	342,9	0,0	6,4
833	-28,17	14,47	561	0,0	32,0	0,0	0,0
834	-28,15	14,52	468	0,0	66,0	0,0	0,0
835	-28,15	14,55	384	0,0	310,0	0,0	56,0
836	-28,28	14,45	475	0,0	42,8	0,0	0,0
837	-28,42	14,43	419	0,0	288,0	0,0	18,0
838	-28,68	14,37	450	0,0	354,0	0,0	0,0
839	-28,55	14,42	380	0,0	170,0	0,0	0,0
840	-28,45	14,60	171	0,0	0,0	0,0	433,3
841	-28,33	14,62	175	0,0	0,0	0,0	60,0
842	-28,28	14,72	210	18,2	228,8	0,0	152,0
843	-28,23	14,92	190	82,4	268,0	0,0	511,0
844	-27,77	15,33	132	0,0	0,0	0,0	153,4
845	-27,88	15,10	168	12,4	0,0	0,0	660,8
846	-28,00	15,05	184	61,0	0,0	0,0	764,0
847	-27,95	14,92	196	228,4	134,2	0,0	462,0
848	-28,07	14,78	200	38,4	380,5	0,0	266,6
849	-28,02	14,65	356	0,0	415,6	0,0	8,3
850	-28,05	14,60	459	0,0	26,8	0,0	0,0
851	-27,82	14,57	557	0,0	78,4	0,0	0,0
852	-27,78	14,62	453	0,0	406,0	0,0	0,0
853	-27,70	14,82	355	0,0	740,0	0,0	0,0
854	-27,63	14,97	235	0,0	92,3	0,0	594,3
855	-27,55	15,05	187	56,4	0,0	0,0	452,0

Annex III Instruments and fishing gear

The Simrad EK-500, 38 kHz echo scientific sounder was used during the survey for fish abundance estimation, in addition data from the 18 kHz, 120 kHz and the 200 kHz transducers were logged for possible future multi frequency target estimation. The Bergen Echo Integrator system (BEI) logging the echogram raw data from the sounder, was used to scrutinize the acoustic records, and to allocate integrator data to fish species. All raw data were stored to tape, and a backup of the database of scrutinized data. The details of the settings of the 38 kHz were as follows:

Transceiver-1 menu	Transducer depth	5.5 m
	Absorption coeff.	10 dB/km
	Pulse length	medium (1ms)
	Bandwidth	wide
	Max power	2000 Watt
	2-way beam angle	-21.0 dB
	SV transducer gain	27.19 dB
	TS transducer gain	27.22 dB
	Angle sensitivity	21.9
	3 dB beamwidth along.	6.9°
	3 dB beamwidth athw.	6.8°
	Alongship offset	-0.01°
	Athwardship offset	0.03°
Display menu	Echogram	1
	Bottom range	10 m
	Bottom range start	9 m
	TVG	20 log R
	Sv colour min	-67 dB
	TS Colour minimum	-60 dB
Printer- menu	Range	0 - 50, 0 - 100, 0 - 150, 0 - 250 or 0 - 500m
	TVG	20 log R
	Sv colour min	-60 dB
Bottom detection menu	Minimum level	-40 dB

A calibration experiment using a standard copper sphere was performed in Langstrand, Namibia 17 August 2003. These settings used during the survey. Another successful calibration was performed near Dakar, Senegal on 8 November 2003. The settings will be changed according to this calibration after this survey.

Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super" bottom trawl. For all trawls, the Tyborøn, 7.8m² (1670 kg) trawl doors were used.

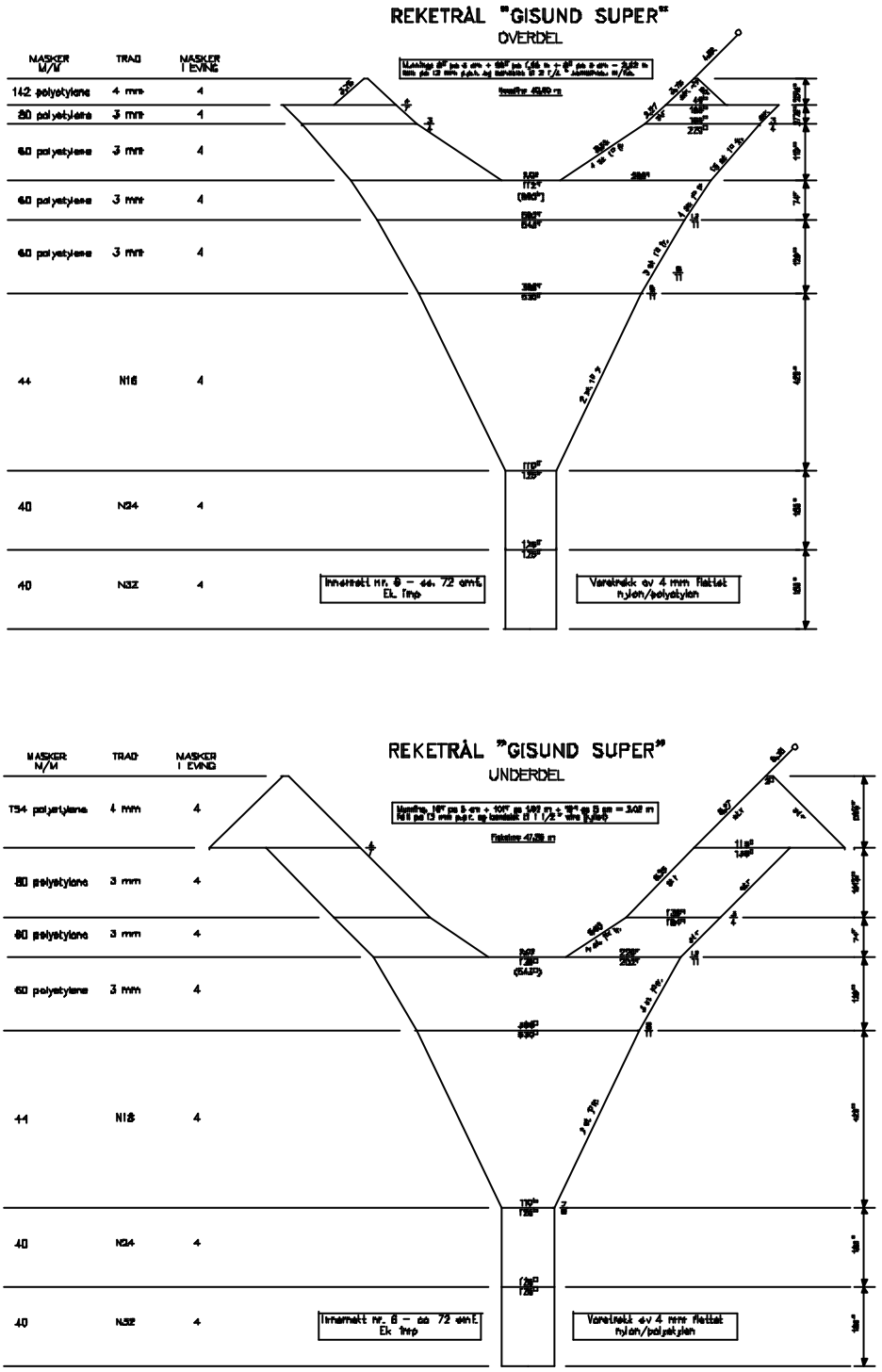

Figure 16a Design of the trawl used.

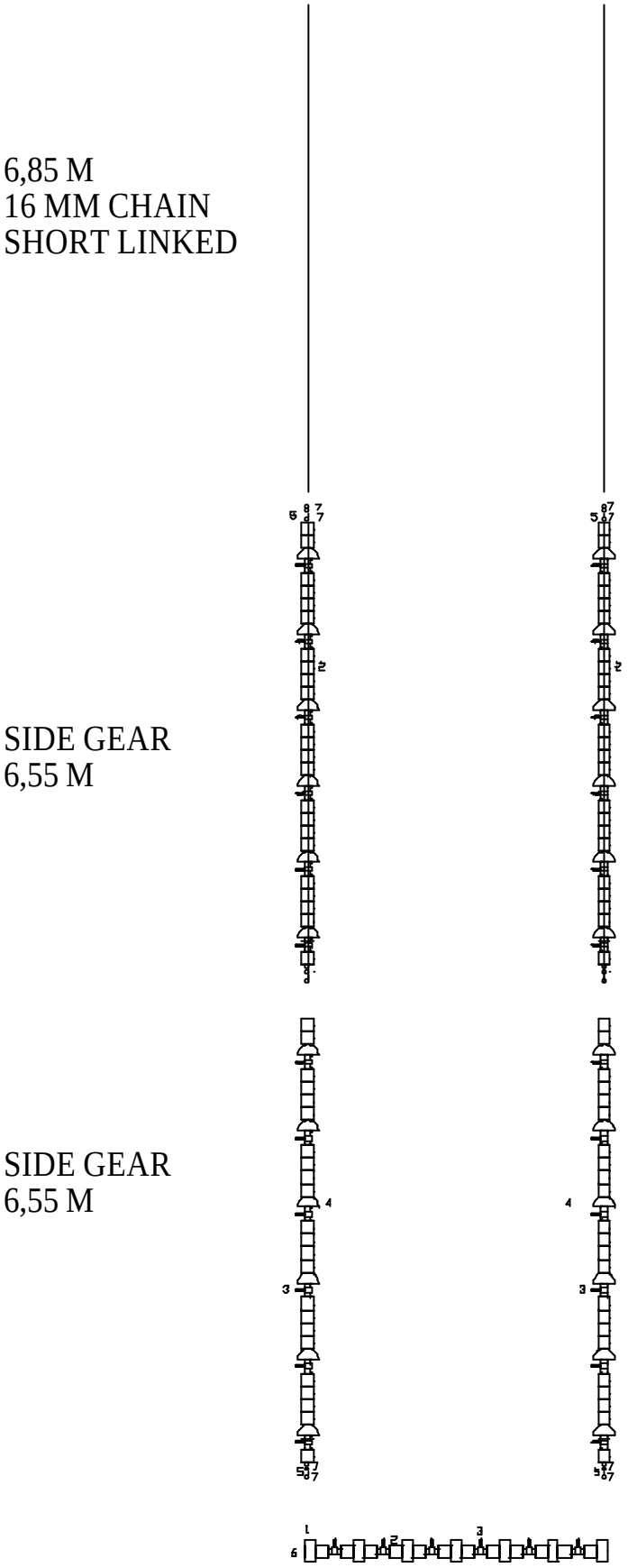

Fig. 16b. Schematic drawing of the ground gear used in the experiment